



eurostat

**CONSUMER PRICE INDEXES
IN THE EUROPEAN COMMUNITY**

1976



DE EUROPÆISKE FÆLLESSKABERS STATISTISKE KONTOR
STATISTISCHES AMT DER EUROPÄISCHEN GEMEINSCHAFTEN
STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES
OFFICE STATISTIQUE DES COMMUNAUTÉS EUROPÉENNES
ISTITUTO STATISTICO DELLE COMUNITÀ EUROPEE
BUREAU VOOR DE STATISTIEK DER EUROPESE GEMEENSCHAPPEN

Luxembourg-Kirchberg, Boîte postale 1907 — Tél. 43011 Télex: Comeur Lu 3423
1049 Bruxelles, Bâtiment Berlaymont, Rue de la Loi 200 (Bureau de liaison) — Tél. 735 80 40

Denne publikation kan fås gennem de salgssteder, som er nævnt på omslagets tredje side i dette hæfte.

Diese Veröffentlichung ist bei den auf der dritten Umschlagseite aufgeführten Vertriebsbüros erhältlich.

This publication is obtainable from the sales offices mentioned on the inside back cover.

Pour obtenir cette publication, prière de s'adresser aux bureaux de vente dont les adresses sont indiquées à la page 3 de la couverture.

Per ottenere questa pubblicazione, si prega di rivolgersi agli uffici di vendita i cui indirizzi sono indicati nella 3ª pagina della copertina.

Deze publikatie is verkrijgbaar bij de verkoopkantoren waarvan de adressen op blz. 3 van het omslag vermeld zijn.

CONSUMER PRICE INDEXES IN THE EUROPEAN COMMUNITY

**Comparison of existing indexes and approaches to
their harmonization**

Report by Josef Stadlbauer

Institut für international
vergleichende Wirtschafts-
und Sozialstatistik an der
Universität Heidelberg

Report completed in March 1975

Reproduction of the contents of this publication is subject to acknowledgment of the source
Printed in Belgium 1977

Foreword

This study, which was carried out on behalf of the Statistical Office of the European Communities, has two objectives; firstly, to examine the consumer price indexes currently calculated in the nine countries of the European Community in order to determine differences in methodology, and secondly, to show possible approaches to further harmonization.

The attempt to put forward practical proposals in an initial harmonization stage proved utopian; the national significance of such an economically and socially important parameter is so closely linked in the various countries to their respective requirements and historical development of price statistics that for political reasons the national Statistical Offices cannot make short-term radical changes in methodology on their own account. Even comparatively minor changes in the method of calculating the index, such as an increase or reduction in the number of prices recorded or reporting units surveyed, require parliamentary approval in a number of countries.

Against this background this study can only provide a basis for discussion with respect to constructing uniform indexes and therefore unrestrictedly comparable index information within the Community.

Accordingly, this study omits as far as possible any assessments of the various national methods and is intended to set out the reasons for the limited comparability of the indexes and to work out the approaches to and possibilities of further harmonization.

The aim of unrestricted comparability between indexes will not be achieved by calculating and publishing a harmonized index for each country in addition to national indexes. Such figures would either be of very little significance or would lead to confusion, since the adjusted figure is considered as correct in some cases and the national figure in others, depending on the sphere of interest. On the other hand, the need for unrestricted comparisons within the Community even at the present stage of economic integration requires no further justification. Standard methods of measuring price levels and developments are in any case essential to attain the goal of economic and monetary union.

The road to harmonization of the indexes is thus indicated in the form of progressive approximation of methods. As the example of the fully harmonized producer price index for agricultural products shows, there is a close connection as far as the methodology of economic statistics is concerned between the importance of economic policy within the Community and the degree of harmonization. As common economic policy, in particular monetary and financial policy, and social policy are transferred from national sovereignty to common sovereignty and administration, statistics will be required to provide more comparable data on the level and development of consumer prices in each of the countries.

These introductory remarks are an appropriate place to express the author's thanks to all the persons and institutions who contributed so much to this study: first and foremost, the members of the Working Party on Price Statistics of the Statistical Office of the European Communities under the chairmanship of Director Silvio Ronchetti and the head of the SOEC Internal Trade division, Dr. Richard Kuhner, without whose advice and readiness to provide information this study could not have been written. However, mention must also be made of all the members of the national Statistical Offices who took the trouble to complete the questionnaires describing the indexes and made additions and amendments to the first version of this study. For any errors and inaccuracies which may remain I ask for forbearance.

The work was completed in Spring 1976. As important structural features of the Belgian consumer price index were modified in June 1976, it was necessary to make corresponding corrections and additions to the report, which were incorporated retrospectively in July 1976.

Contents

I	<u>Introduction</u>	4
	1. National and international significance of the consumer price index	4
	2. Comparison between the countries of the Community	6
II	<u>Comparison of indexes</u>	7
	1. Tabular representation of concepts and methods	8
	2. Similarities and differences in concepts and methods	25
	3. Comparability of the information provided by the indexes	31
III	<u>Approaches to harmonization</u>	33
	1. Type of index	35
	2. Field of observation	47
	3. Statistical sources and methods of determining the basic data of the market basket	52
	4. The market basket	54
	5. The price survey	58
	6. Substitution, quality changes, new products	59
	7. Seasonal products	64
	8. Calculation of the national index	65
	9. Validation, revision, continuous series	65
	Annex 1: Composition and weighting of the market basket	66
	Annex 2: Plan of inquiry to determine structural differences between consumer price indexes of the countries of the European Community	75

I Introduction

1. National and international significance of the consumer price index

- (1) There is hardly another statistical figure in economics which is of such national and international significance as the consumer price index. Its annual rates of change are regarded in all countries as an indicator of trends in the general level of prices and therefore of the purchasing power of money in general. The percentage variation in the consumer price index and the rate of inflation are used synonymously. This index is thus an instrument of economic analysis and is used as a criterion for assessing the effectiveness of past economic measures and for shaping such measures in the future. This applies to both national and international comparisons.
- (2) Although great significance has always been attached to the temporal development of consumer prices within a particular country, there has been increasing interest over the past few years in international comparison. The scope and direction of the flows of goods, services and financial assets between the various national economies are influenced to a considerable extent by the rate of inflation and have far-reaching cyclical and structural consequences. This is particularly true of the comparatively high and relatively different rates of price increases in the various countries of the Community. These connections are clearly reflected in the development of the floating rates of exchange and the interventions of the central banks.
- (3) Various factors favour the use of the consumer price index as the general indicator of purchasing power:
 - It measures changes in the price of goods and services for final consumption which is the ultimate purpose of all economic activity and which constitutes the main use of income for the majority of the population.
 - The information provided by the index can be understood by the general public. The concept of the market basket for those goods which are part of everyday requirements is in general current use and the whole population can discern price changes, albeit in varying degrees.
 - Finally, the fact that the calculation and publication are up-to-date plays an important part.

- (4) Other price indexes which might be used as indicators of purchasing power do not have all these characteristics. Producer price indexes and wholesale and retail price indexes are unsuitable on account of the material and personal field of observation. The deflators of the national accounts (NA), such as the price index of final (domestic) consumption and the price index of private consumption, seem a priori more suitable than the consumer price index for measuring national economic purchasing power; since they are designed for the whole of the national economy. However, for numerous reasons which it is impossible to go into here, they are in fact not proper price indexes and must therefore be eliminated.
- (5) Like any convention, the one whereby the consumption of private households is used as the basis for determining the general purchasing power of money cannot be deemed right or wrong, but it may be contested. Private households' consumer purchasing power is not the only subject of interest in temporal comparisons within a given country; trends in the institutional purchasing power of the money held by enterprises or the State and in the functional purchasing power of savings and investments are also important from the point of view of economic policy. At least in the short and medium term, international economic relationships are not so much dependent on changes in consumer prices as on prices of capital goods.
- (6) In spite of these objections, the rôle of the consumer price index is uncontested. No other price index designed for particular markets or institutions has such a universal character. Its applications are also universal: as well as being used as an indicator of the purchasing power of money at both national and international level, it is also used in the various countries for adjusting incomes, annuities, pensions and social assistance benefits and for adjusting prices in commercial and civil contracts. A further application, limited to international comparison, is the forward projection of purchasing power parities, which cannot be surveyed continuously.
- (7) Although application at national level requires a specific national version of the index, for international comparisons an index calculated in accordance with uniform methods in all countries is desirable. These divergent requirements have been for a good many

years the concern of the conferences of labour statisticians at the International Labour Office (ILO) in Geneva. In the course of their work, a certain international standard for methods of calculation was laid down,¹ which has sensibly increased the significance of the consumer price index in international comparisons.

It can thus be stated even in these preliminary remarks that, in spite of the differences in the methods of calculation and the resulting differences in the information provided by the indexes, which are shown in Section II below for the countries of the European Community, there is not a better alternative to the consumer price index for the purposes of studying the temporal development of price levels.

2. Comparison between the countries of the Community

- (1) The comparison of rates of price changes in the nine countries of the Community is even more important than the comparison with third countries for two reasons:

in the first place, the degree of interlocking between the national economies of the Common Market countries is far greater than with the majority of third countries. The interdependence of the rates of inflation is therefore correspondingly greater.

The second reason is to do with social policy and arises from the objective laid down in the Treaties of the European Communities and especially in Article 117 of the EEC Treaty and the regulations base upon them and aiming to eliminate social differences in the Community and evening out discrepancies in living conditions. One of the requirements this involves is the ability to compare the temporal development of real income in the various countries. For this purpose, the SOEC has been calculating purchasing power parities since the 'fifties. However, these calculations entail great expense and can only be made from original data at certain intervals. In the intervening periods, projections must be made with the help of consumer price indexes.

1 A summary of the ILO recommendations is contained in: International Labour Office: The calculation of consumer price indexes (special problems), Geneva 1962.

- (2) Since its existence the Statistical Office of the European Communities has published in its current monthly statistics consumer price index figures based on national information, with some adjustment of the private consumption sector surveyed (at least for the six original EEC countries). This means, however, that these figures are not fully comparable either as a number of other influences distorting the comparison are not eliminated.

II Comparison of indexes

The following table summarizes national ways of solving the various methodological problems. In accordance with the aim of the study, the emphasis is on the differences between individual countries. The data are taken from publications of the national Statistical Offices and the they made to the questionnaire appended to this study in Annex 2.

1. Tabular representation of concepts and methods¹

(1) Name of index (a) Widest field of observation if several indexes are calculated	(2) For which other index households are index numbers calculated?
I.1.	I.1.
D Cost-of-living index for all households	- Workers' with average income - Employees' and officials' with higher income - pensioners' and households receiving social assistance
F Consumer price index (Indice des prix à la consommation, indice des 295 postes de dépense) (Index of 295 items of expenditure)	Workers' and employees' in towns
I Consumer price index (Indici dei prezzi al consumo)	Workers' and employees' in towns
N Consumer price index for the whole population (Prijsindexcijfers van de gezinsconsumptie voor de totale bevolking)	
B Consumer price index (Indice des prix à la consommation)	
L Consumer price index (Indice pondéré des prix à la consommation)	
UK General index of retail prices	
IRL Consumer price index	
DK Consumer price index for all private households (Forbrugerpris indexet)	Workers' and employees'

1 The numbers refer to the questions in the questionnaire (see Annex 2)

	(3) Formula i.2.	(4) Publication 1.7. (a) Methods	(b) Results
D	Laspeyres	Statistisches Bundesamt, Wirtschaft und Statistik 1973, 12	Wirtschaft und Statistik
F	Laspeyres chain index with annual linking in December	I.N.S.E.E., Economie et Statistique No 21, March 1971	Ministère de l'Economie et des finances, Bulletin mensuel de Statistique
I	Laspeyres	ISTAT Metodi e Norme, Serie A, No 12, 1971	ISTAT, Bolletino mensile de Statistica; Notizario ISTAT-serie 2 foglio 21
N	Laspeyres	CBS, Sociale Maandstatis- tiek, No 11, 1971	CBS, Statistisch Bulletin, Sociale Maandstatistiek, Maandschrift
B	Laspeyres (since June 1976 index items have been weighted)	Institut national de Statistique, Bulletin de Statistique, May 1972.	as (a)
L	Laspeyres	STATEC, Bulletin du STATIC, No 6, 1967	as (a) Bulletin du STATEC Rapid indicator
UK	Laspeyres chain index with annual linking in January	Department of Employment, Method of Construction, Studies in Official Statistics, No 6	Central Statistical Office, Monthly Digest of Statistics, Dep. of Empl., Department of Employment Gazette
IRL	Lapeyres	Central Statistical Office, Irish Statistical Bulletin, March 1969	as (a)
	Laspeyres	Danmarks Statistik, Statistiske Efterretninger, No 51, 1969	as (a)

(5)	(6)
Frequency of publication	Field of observation:
I.7.1.	consumer goods
	II.1.
D Monthly	Combination of market and consumer concepts; assesment of own consumption and allowances in kind at retail prices; motor vehicle tax included; concept of integrated national accounts (new SNA, ESA) aimed for
F Quarterly; also monthly index for worker households	Derived from Franch national accounts; however, own consumption and allowances in kind excluded but imputed rents for owner-occupied dwellings included.
I Monthly	Based on integrated national accounts concept; imputed rents and own consumption are not included
N Monthly	Definition of private consumption agrees with national accounts; difference only in non-imported second-hand cars and sub-letting, which, unlike in the national accounts, are included in index consumption
B Monthly	Combination of market and consumer concepts (rents, imputed rents and seasonal goods have been included since June 1976)
L Monthly	Combination of market and consumer concepts; rent excluded, but will probably be included in 1976 or 1977
UK Monthly	Combination of market and consumer concepts
IRL Quarterly	Combination of market and consumer concepts: household data for consumer goods and services; own consumption of agricultural products and allowances in kind assessed at retail prices
DK Monthly	Based on Danish national accounts (corresponds to previous SNA system); is in future to be adapted to the current SNA and ESA.

(7)

Accommodation

II.3.1.

D Rented and owner-occupied dwellings; weight for imputed rent is contained in the overall weight for rent. five rent series, broken down by size and age of dwelling, and financing; quarterly survey of 10 000 dwellings; water consumption included under 'accommodation'

F Rented dwellings covered, weight; net rent, new series since 1974 with imputed rents for owner-occupied dwellings; half-yearly survey of 3 500 dwellings; water consumption included under 'accommodation'

I Rented dwellings covered but not owner-occupied dwellings; quarterly survey of 13 500 dwellings; basic indexes of main provincial towns are aggregated and weighted by the population in rented dwellings (1969); the four regional indexes are averaged in accordance with information from the regional integrated accounts; incidental expenses included for owner-occupied dwellings as well

N Rented dwellings covered, weight: net expenditure on rent from family budgets; rents for owner-occupied dwellings estimated, mortgage interest and maintenance expenditure do not fall within the scope of the survey; half-yearly survey of 13 000 rented dwellings in 500 communes; 6 quality characteristics

B Rented dwellings covered, rents for owner-occupied dwellings taken from national accounts; monthly survey of 1 800 rented dwellings in 62 communes

L No rents (to be included in 1976 or 1977); no owner-occupied home costs; maintenance and repair costs are included

UK Rented dwellings included, weight : net rent; owner-occupied dwellings included, weight: payments of mortgage interest (from February 1975, before that estimated rent equivalent); information from local authorities on their rented dwellings; 3 000 private rented dwellings surveyed twice a year; repairs, taxes and water consumption included

IRL Rented dwellings surveyed, weight: expenditure on rent from family budgets; no owner-occupied dwellings, but incidental expenditure is included; social dwellings are surveyed every November and 800 privately-financed dwellings quarterly by postal survey of owners

DK Rented dwellings covered, weight: net rent, including imputed rent for owner-occupied dwellings, which are represented by rented dwellings; one rent series, half-yearly survey of 5 000 dwellings; decorating work and materials included under 'accommodation'

(8)

Insurance

II.3.3.

D

Motor vehicle liability insurance, health insurance (private) and home contents insurance included; no other types of insurance recorded

F

No insurance included; expenditure on medical supplies and car repairs recorded directly

I

Only motor vehicle liability insurance included

N

Health insurance is recorded with the total amount of premium payments including employers' contributions; state subsidies are counted as private consumption; for other types of risk insurance, only the proportion of administrative costs is included in the weighting

B

Motor vehicle liability insurance and fire insurance included

L

Only motor vehicle liability insurance included

UK

Motor vehicle liability insurance and insurance of owner-occupied dwellings included; no other types of insurance recorded

IRL

Motor vehicle liability insurance and building insurance included; health insurance and life assurance not included

DK

Motor vehicle liability insurance not included; no health insurance, but non-refunded items of health expenditure are included

	(9)	(10)	(11)
	Interest paid	Direct taxes	Proportion of private consumption in national accounts included in the index of private consumption
	II.3.4.	II.3.5.	II.4.
D	Nil	Motor vehicle tax included	At least 94 %
F	Nil	Nil	98.5 %
I	Nil	Nil	93.5 %
N	Nil	Nil	No figures available; apart from non-imported second-hand cars and sub-letting, the field of observation is the same as in the national accounts.
B	Nil	Nil	No figures available
L	Nil	Nil	No figures available, but proportion is slight
UK	Mortgage interest used as cost indicator of owner-occupied dwellings	Annual motor vehicle tax, driving licence and local taxes (rates) included	No information
IRL	Interest factor in instalment buying taken account of in the weight	Nil	Apart from imputed rents for owner-occupied dwellings, rent-free dwellings and insurance premiums, the field of observation is the same as in the ESA
DK	Nil	Nil	Field of observation the same as in national accounts

(12)

Field of observation;
index population
II.5.

D All private domestic households excluding institutional households and those with a net monthly income of DM 10 000 and over; index household comprises (1970) 2.7 persons; consumer expenditure (1970) DM 1 294 per month

F Entire population including institutional households; no limitation on size or income; average size of index households (1969) 3.37 persons; average income (1969) FF 16.500 per month

I All private households, no limitation on size or income

N All private households, no exceptions

B Private households not including those of self-employed persons

L Worker and employee households with low incomes; no limitation on size, average size (1963/64) 3.4 'net consumer units'; average annual consumer expenditure (1963/64) Lfrs 120 000

UK All private households, excluding those of pensioners with low incomes and those whose gross weekly income exceeds an upper limit (reassessed at least once a year, 1972: £ 70); 1973: average annual expenditure £ 1 575, average size of family 3.70 persons

IRL All private households in urban areas; no limitation on size or income; average figures taken from 1965/66 economic accounts; size 4.03 persons, annual expenditure £ 1 103.6

DK All private households; no limitation on size or income

(13)	(14)
Index population as a proportion of total population II.6.	Frequency of family budget surveys III.6.
D Approx. 92 %	At intervals: 1962, 1969; for checking purposes, however, regular surveys of the three more narrowly defined types of household
F Entire resident population is included	For checking purposes, regular surveys for the index of employee and worker households
I Entire resident population is included	At intervals: 1953, 1966, 1970, 1976
N Entire resident population is included	At intervals of 5-10 years
B Resident population excluding self-employed persons	At intervals: 1961, 1973
L Population with modest income considered	At intervals
UK Approx. 87 %	Regular surveys
IRL (1971) 67 %	At intervals: 1965/66, 1973
DK Entire resident population is included	At intervals of 4-5 years

(15)

Computation of weights

III.3.

D Various sources, but mainly from the family budgets in the 1969 sample surveys of income and consumption, converted to 1970 price levels

F Weights are revised annually; national accounts and surveys of total consumption and food consumption; weight of year n: consumption of year n-2 adjusted for the price fluctuation between year n-2 and December n-1

I National accounts for 1969
Family budget surveys for the index of worker and employee households

N Family budget surveys from June 1963 to May 1965 among 5 000 households; 1969 results adjusted by means of national accounts data, retail trade and production statistics

B Composition of market basket in accordance with 1973 family budget survey (2 613 households)

L Family budget surveys from March 1963 to March 1964 with a sample of 2 092 households, 485 of which were retained for weighting purposes

UK Weights are revised annually; regular family budget surveys, weighting system based on the last 12 months for which data are available (from February 1975 - three yearly averages before this); size of 1974 sample 6 695 households

IRL 1965/66 family budget surveys of 4 800 private urban households, random sample; figures adjusted for price movements from 1966 to November 1969

DK Apart from data in 1966 national accounts, 1966 family budgets of worker households also used (2 000 households); figures adjusted for price movements from 1966 to February 1969

(16)

Market basket ¹ base (since)

IV.4.

D 1970 average (since 1973)
calculated back to January 1968

F 1970 average (since 1970)

I 1970 average
(since 1971)

N 1969 average
(since 1970)

B July 1974 - June 1975 average
(since June 1976)

L 1965 average
(since 1966)

UK 15 January 1974
(since 15 February 1974)

IRL Middle of November 1968
(since November 1968)

DK 1964 average
(since 1965), to be converted to 1970

1 For the composition and weighting of the market baskets see Annex 1.

(17)

Price survey:

Definition of reporting units (except for fixed-scale charges, accommodation, etc.)

V.1.2.

D All sales outlets including the mail order trade;
selection based on size of turnover

F All sales outlets excluding the mail order trade;
representativeness based on geographical dispersion or concentration,
depending on article

I Reporting units selected by local councils

N All sales outlets excluding the mail order trade; selection based on
turnover referred to type of outlet and branch; three-stage sampling

B All sales outlets excluding the mail order trade; selection based on
size of turnover

L All sales outlets excluding the mail order trade

UK All sales outlets excluding the mail order trade; selection matched to
trade structure

IRL All sales outlets excluding the mail order trade

DK All sales outlets; selection taken from commercial register, based on
turnover

	(18)		(19)
	Number of prices surveyed and reporting units; geographical distribution V.1.3.		Direct or postal survey V.9.
D	Prices: over 200 000 Reporting units: approx. 30 000 Communities surveyed: 118		Apart from fixed-scale charges etc., direct survey conducted by interviewers
F	Prices: 160 000 Reporting units: approx. 25 000 Communities surveyed (towns) 108		Apart from fixed-scale charges, etc., direct survey conducted by interviewers
I	Prices: 360 000 Reporting units: 25 000 Communities surveyed: 94 (main provincial towns)		Apart from mixed-scale charges, etc., direct survey conducted by interviewers
N	Prices: 100 000 Reporting units: 14 500 Communities surveyed: 101		96 % direct 4 % surveyed by post
B	Prices: 41 500 Reporting units: 4 730 Communities surveyed: 62		Apart from fixed-scale charges, etc., direct survey conducted by interviewers
L	Prices: 3 500 Reporting units: 400 Survey restricted to the city of Luxembourg		Apart from fixed-scale charges, etc., direct survey conducted by interviewers
UK	Prices: 150 000 Reporting units: 10 000 Communities surveyed: 200		50 : 50 direct and postal surveying; postal survey mainly among manufacturers
IRL	Prices: 30 000 Reporting units: 2 500 Communities surveyed: 118		Mainly direct survey conducted by interviewers
DK	Prices: 32 000 Reporting units: 2 600 Communities surveyed: 48		19 % direct, 81 % postal survey

	(20)	(21)
	Change of reporting unit V.7.	Frequency of surveys V.18.
D	Considered as quality change and adjusted	Apart from rents, fixed-scale charges, etc., between the 10th and 15th of the month; fruit and vegetables twice monthly from May to October
F	No special provisions	Monthly; some foodstuffs and seasonal goods weekly
I	No information	On the 15th of the month; in the case of foodstuffs on the 5th, 15th and 25th of the month; services quarterly
N	Influence on prices is eliminated if a large number of reporting units changes	Generally monthly on the Thursday of the week in which the 15th of the month falls Weekly: seasonal goods Every two months: gas, electricity Quarterly: insurance Over nine months: clothing
B	No special provisions	Between the 1st and 20th of the month
L	No special provisions	Monthly in the first ten days of the month
UK	No special provisions	On the Tuesday falling between the 16th and 22nd of the month; quarterly for alcohol, beverages, tobacco, coal, petrol and important household goods
IRL	Strict observance of types of reporting units	Tuesdays falling in the middle of the months of February, May, August and November
DK	New reporting units are only included after two successive surveys	Between the 15th and 21st of each month

(22)

Substitution, quality changes

VI.4.

D Quality changes are ignored if the value of a commodity is little changed for the consumer; chain-linking, correction factors

F Substitution of the Variétés both at the annual change of weights and within a year; no fixed rules when quality change leads to substitution; chain-linking, correction factors

I No information

N Substitutions carried out regularly; prices surveyed are examined with respect to probability, general level and previous prices and eliminated if necessary; correction factors, which are not published, are used for the purposes of eliminating quality changes

B No fixed rules when quality change leads to substitution; regular adjustments possible

L Adjustments are made; no fixed rules when quality change leads to substitution

UK Substitution at annual change of the market basket; no fixed rules when quality change leads to substitution; adjustments made on the basis of expert information

IRL A distinction must be made between 'index article' and 'form as surveyed'; if the quality of the latter changes, the new price is not included in calculations until after two successive surveys

DK Decision on substitution and elimination of qualitative influences made from case to case; adjustments for cars based on the opinion of consumer organizations and producers

(23)

Seasonal Products

VII.3.

D Index calculated and published with and without "particularly seasonal products and products particularly dependent on harvesting and the weather"; seasonal products: potatoes, fresh fruit, fresh vegetables, fresh fish, eggs, flowers, coal and heating oil

F Fresh goods, flowers and plants: variable items and weights within 5 groups with constant weighting; monthly prices for each item are related to the reference month in the previous year; moving average of the last 12 months

I Minimum price method: fresh vegetables and fruit may be substituted for each other; the first 50 % of a list of fruit and vegetables arranged in ascending price order are recorded and a moving 13-month average calculated

N Fresh fruit, vegetables, herrings, flowers and some articles of clothing: variable monthly items and weights within groups with constant weighting; apart from herrings and articles of clothing, monthly prices adjusted for seasonal influences; moving quarterly averages (except for clothing)

B Seasonal goods since June 1976: fresh fruit, fresh vegetables, travel; seasonal monthly market baskets related to the reference month in the previous year

L Fresh fruit and vegetables: variable monthly items and weights within the two groups with constant weighting; monthly prices are related to the reference month in the base year; moving average of the last 12 months

UK Index calculated with and without seasonal foodstuffs; from February 1975: variable monthly weights within the groups food and vegetables, which have overall constant weights

IRL Eggs, potatoes and tomatoes: prices adjusted for average seasonal price changes over the past 5 years every quarter, except for August; method 2 of the US Bureau of Census is being tested

DK Fish, vegetables, fruit: seasonal factors determined from the last 5 years; prices adjusted

	(24)	(25)
	Weighting proportion of seasonal products in total index VII.6.	Revisions
D	6.242 %	Target is every 5 years; next base year probably 1975
F	4.67 %	Annually (chain index)
I	6.76 %	Next base year 1976
N	18.73 %	Target is every 5 years; next base year probably 1975
B	4.11 %	No fixed intervals; next base year probably 1976
L		No fixed intervals since there are no regular family budget surveys; revision depends on data
UK	3.37 % - 3.81 %	Annually (chain index)
IRL	3.053 %	Regular intervals aimed for; difficulty owing to absence of weighting data
DK	2.07 %	4 - 5 years

(26)

Calculation of national index

VIII.1.2.

D The national index is the weighted arithmetic mean of price indexes in the Länder und West Berlin; weight: resident population

F Price indexes are calculated for the individual "Variétés" of 32 classes of the 108 communities surveyed; these are weighted with regional population and turnover figures

I Four regional indexes are calculated from the price data from 94 main provincial towns, weighted by population figures for 1969; these are aggregated to give the national index by further weighting with consumer information from the regional accounts

N Average national prices are calculated by weighting with both population and turnover figures

B The national index is the weighted average of each index series of the 62 communities surveyed; the weight is the population on 31.12.1965

L The price index of the capital city Luxembourg is considered as representative of the whole country

UK No regional indexes are calculated

IRL Average prices are calculated for 7 categories of community; national average prices by means of weighting with population components; price relationships to the previous survey are aggregated to form the national index by using household expenditure

DK Regional average prices are aggregated to give the national average by weighting with the resident population

2. Similarities and differences in concepts and methods

Definition and function of the index

- (1) Attempts are being made in all countries to determine, by means of the respective price index, only that change in the cost of living which results from pure price movements. Two different types of index are used for this purpose. France and the United Kingdom use a Laspeyres chain index with a market basket changing annually, both as regards its composition and weighting¹, while the other seven countries use the Laspeyres formula with a basic market basket being retained over a period of several years.
- (2) As mentioned at the outset, the current differences in methodology are mainly due to the considerable national significance which the consumer price index has in each country. It is true that all nine indexes studied generally serve the same purposes, but there are considerable differences of principle and degree. Belgium and Luxembourg may be cited as extreme cases since the indexing of many transactions such as wages, salaries, fees and rents overshadows all other uses. To a lesser extent this is also true of the other countries with the exception of Germany; in France, Italy, the Netherlands and Denmark a special index is calculated for indexing purposes.

The different weights attached to functions from one country to another result in public institutions participating in and influencing the make-up of the index to varying degrees.

Field of observation: consumer goods and index population

- (3) Two basic approaches are used to define private consumption. France, Italy, the Netherlands and Denmark define the field of observation in more or less strict accordance with their national accounts. This means, amongst other things, that data in the national accounts can be referred to in setting up or updating the weighting model. On the other hand, the other countries make use of a rather different

¹ See Section III.1. (1)

compromise between the market and consumer concepts¹ and have to resort to family budget surveys in order to obtain their weighting data. Despite reasonable international standardization of national accounting systems, however, not even the definition of the concepts derived from these accounts is fully comparable.

The most serious differences arise with respect to rent series, which have not yet been included in Luxembourg, as well as the inclusion of owner-occupied dwellings by imputed rents in the weighting of the group 'accommodation'. This latter item is missing in Luxembourg, Italy and Ireland.

Further differences can be seen in the recording of insurance; France and the Netherlands are out of line as they base weighting on the corresponding expenditure rather than on the insurance premiums. In Denmark, insurance expenditure is not included in the field of observation.

The differing interpretation and assessment of own production and allowances in kind should also be mentioned; these are not included at all in France and Denmark, and in Ireland, unlike all the other countries, they are assessed at retail prices instead of producer prices.

- (4) As regards the scope of the index population, all countries with the exception of the United Kingdom and Luxembourg calculate indexes which are intended to be representative of all private households. France even includes institutional households as a logical application of the national accounting concept. In the United Kingdom low-income pensioners' households and households whose gross weekly income exceeds a certain limit are not represented by the index.

The size of households and their income and expenditure are somewhat different on account of national factors and ways of life.

Statistical sources and methods of determining the basic data of the market basket

- (5) As stated above, countries which base their field of observation on national accounts take most of their weighting data from these accounts, using family budget surveys to supplement these for the sub-groups.

1 See section III.2. (2)

On the other hand, the other countries rely first and foremost on these family budget surveys and only use national accounts data for rough weighting and control purposes. In the United Kingdom these surveys are carried out and analysed regularly on a fairly large sampling basis; in the other countries they are carried out at irregular intervals and regular surveys, such as those conducted in Germany, are used mainly for control purposes.

- (6) Although all the countries select their index items with a view to representativeness and survey practability, they do not apply these criteria to the same extent.

The market basket: composition, weights, base

- (7) The considerable differences in the market baskets are the result of the discrepancies described above in definition, field of observation and methods of obtaining basic data. Despite intense international efforts, the nomenclature and classification of the market baskets do not tally. However, some degree of comparability can be obtained by appropriate regrouping.
- (8) As far as the number of index items is concerned, the greatest differences are between Germany with 899 and Luxembourg with 173; however, a distinction must be made here between published and surveyed items. This is shown most clearly by the French index, which is composed of 299 items of expenditure, whereas the total number of 'Variétés' surveyed for these items is 973.
- (9) Different consumer habits in the nine countries are reflected in the varying items and weights for the various groups of wants, particularly foodstuffs and more especially fresh products.

The price survey

- (10) All countries normally take all sales outlets into account but, apart from Germany, they do not include the mail-order trade. This is undoubtedly due to the differing size of turnover. All countries apart from Luxembourg, select their reporting units by means of multistage sampling, deliberately aiming at the highest possible degree of representativeness ensured by size of turnover for each index item. The differences in the degree obtained, which certainly

exist, cannot be determined since unambiguous and/or objective criteria are not applied by any of the nine countries.

- (11) A change in the trade structure is reflected in the price index in various ways, including the disappearance of old reporting units which must be replaced by new ones. If such a change occurs, it is regarded in Germany and Denmark as a quality change to be eliminated. Ireland adheres strictly to the types of reporting units. The influence on prices resulting from the change of many businesses is eliminated from the Dutch index when it can be detected.
- (12) Two countries stand rather apart as regards the percentage of postal surveys of price data. This is 50 % in the United Kingdom and for Denmark it is stated that 81 % is collected by postal surveys.
- (13) All countries record the various items at different intervals depending on the extent of price movements. Foodstuffs are recorded three times a month in Italy and weekly in the Netherlands. On the other hand, surveys are held only every three months in Ireland and the results are also only published quarterly.
- (14) The varying numbers of prices surveyed are the result of the differences in size and structure of the nine countries. The same is true of the number of reporting units and communities surveyed.
- (15) Where information is available, accuracy in the description of index items in the lists of price survey officials can be roughly classified as follows: very accurate details in the Netherlands and France, leaving the official comparatively little option in selecting specific characteristics. There is far greater scope for interpretation in Germany, Belgium, Italy and Denmark, and in Ireland it is left mainly to the official himself to decide which characteristics of a given article he surveys.

All countries do, however, ensure that the characteristics selected by the survey officials are not changed in temporal comparisons.

Substitution, quality changes, new products

- (16) The problem of substitution and the inclusion of new products is not as acute for the French and British indexes with their annual change of weights as it is for the other countries, whose market basket remains constant over longer periods.

The remarks already made concerning the representativeness of the reporting units selected are even more applicable to the treatment of quality changes; the methodological differences which certainly exist cannot be described exactly as decisions are taken from case to case and no unambiguous, objective criteria are applied.

- (17) With the exception of Ireland, all countries make adjustments by means of correction factors and chain-linking. In the Irish price index, a quality change in a given model is considered as a different product, the price of which is not included in the calculation until two successive quarterly surveys have been carried out.

Seasonal products

- (18) The main seasonal products in all countries are fresh fruit and fresh vegetables. France, Italy, the Netherlands and Denmark also include fresh fish. The Italian price index also considers flowers, the German one flowers and fuels, and the Dutch one some articles of clothing as seasonal foods. Mention must also be made of the elimination of seasonal variations in the price of holiday travel in Belgium and in hotel prices in Denmark.
- (19) Seasonal goods have different consumer significance in the nine countries, which is probably why the methods of eliminating seasonal price movements differ.

The index is calculated and published with and without seasonal goods in Germany; this was also the case in the United Kingdom up to January 1975.

The Italian price index uses the 'minimum price criterion', which is based on the mutual substitution of fresh fruit and fresh vegetables.

The first 50 % of the products on the list of articles surveyed, arranged in ascending price order, is used. These price data are then rounded off by means of moving monthly averages.

Prices surveyed in Ireland and Denmark are corrected by means of seasonal factors based on the average seasonal price changes over the last five years.

Monthly market baskets have been formed in France, the Netherlands and Luxembourg since February 1975 and also in Belgium since June 1976; although the weighting of the groups is constant, the baskets differ in respect of the weights used and in France, the Netherlands and Luxembourg in respect of the items within the groups also. Moving averages are used in these three countries.

Calculation of national index

- (20) The Community employs the two basic methods of calculating regional indexes and their weighting, and determining average national prices.

The two methods of weighting, i.e. with population figures and with consumption data such as regional expenditure on private consumption in Italy, are also used.

Validation, revision, continuous series

- (21) The information received shows that check calculations are mainly used to test the reliability of the prices surveyed. In the Netherlands the price data are checked by effecting a normal distribution of their arrangements, and prices which do not fall within a probability range of 0.997 in relation to the average price are examined more closely. Prices deviating from previously surveyed prices by a certain percentage are examined more closely before being included in the calculations. These percentages vary from article to article. A price margin is also laid down for each article and each survey month, and if this is exceeded checks are carried out.

Such detailed rules are not known in the other countries.

- (22) In Germany, provided up-to-date index data are available, a Paasche index series is calculated for control purposes in addition to the Laspeyres index. In the United Kingdom, corresponding Laspeyres figures are calculated for purposes of comparison along with the chain index, though unofficially.
- (23) Revisions are carried out annually in the chain index countries France and the United Kingdom. Information received from other countries indicates that, although there is a desire for fixed intervals between revisions, this proves difficult as there are

insufficient or no regular weighting data. A period of five years is stated as the interval between revisions.

- (24) As in the chain index countries, continuous series are established in the fixed-base index countries by means of chain-linking, normally over a period of one month. Ireland links every quarter, Denmark annually.

3. Comparability of the capabilities of the indexes

- (1) As in any international comparison, the national indexes cannot be used within the Community to compare the absolute price level, but are only indicators of trends in the level of prices. In a national context, on the other hand, they show the level and rate of change of prices in relation to a base year. Biases in the determination of the various national price levels could be tolerated if in temporal comparisons they remained constant and were thus without a distorting influence on the calculation of trends in price levels. However, for most inter-country comparisons this is not likely in view of the current differences of approach and methodology.
- (2) This is particularly true in view of the current speed of price development, which varies greatly among the nine countries. Generally speaking, the higher the rate of price increase, the greater the margins of error are likely to be, which will have a further adverse effect on the comparison.

Similarities and differences between the capabilities of the indexes

- (3) First of all, a distinction must be made between the 'intended' and the 'actual' capability of the index. The intended capability refers to the definition and function of the index and shows for which goods and services and for which persons the index is intended to be representative. In short, it answers the following question: what does the index measure for whom? The actual capability differs from the intended capability if the methods such as type of index, determination of the basic data of the market basket, price survey, substitution, etc. are unsuitable for the approach chosen. As a result of this discrepancy each national index contains an error which may be termed the procedural error. There is also a sampling error, since the market basket and prices can never be surveyed in

their entirety. In international comparison the procedural error increases in proportion to the difference in concepts and methods between the indexes compared. International comparison is further impaired by the various sampling errors, since the samples are taken from differing national parent populations, whose size and dispersion do not generally tally.

- (4) The similarities between the index capabilities are limited primarily to the intended capability: in all the countries of the Community, as in the rest of the world, the price index is only intended to measure the change in the cost of living resulting from pure price movements. There is thus no intention of calculating a cost-of-living index, which would be a value index, but recording price changes in a market basket which remains constant as regards quantity and quality. The index is not intended to reflect either the changes in tastes and consumer habits brought about by changes in income or life-style, or those voluntary or forced shifts in the pattern of consumption which result from alterations in price structure and with the appearance of new products. The success of this approach depends on the other methods, particularly the type of index, price survey and substitution, which are handled differently in the countries of the Community, with the result that the actual capability of the index varies from country to country.
- (5) There are no other similarities of approach between all the national indexes; only groups of countries can be formed, as shown in the previous section during the discussion of concepts. In the first place, the main difference between the intended capabilities of the indexes lies in the scope of imputed consumer expenditure included in the field of observation, which is particularly limited in France, Luxembourg and Ireland. Secondly, the index in Luxembourg and the United Kingdom is not representative of the entire population.
- (6) If the intended capability of the various indexes in the Community is not fully comparable, this is true to a far greater extent of their actual capability, as the comparison of methods makes clear. The spectrum of methods from the recording of the basic data of the market basket to the treatment of seasonal goods is so wide that it

is difficult to form groups. It is thus only possible to isolate crass methodological divergences from standard practice in the other countries, liable to lead to significant differences in the actual capability of the index, as follows:

- The chain index calculated by France and the United Kingdom
- 50 % and 81 % of surveys conducted by post in the United Kingdom and Denmark respectively
- The fact that the German index does not smooth seasonal fluctuations in certain prices.

Errors in comparison of the capabilities of the indexes

- (7) As a result of the differences in their capabilities, errors are made in unrestricted comparisons of the indexes. The overall error in the comparison of a pair of indexes is compounded of the procedural and the sampling error.
- (8) Neither procedural or sampling errors are determined in any country; this is not possible either in theory or in practice if the prices surveyed are not chosen by random sampling. In practice, it is almost certainly impossible to determine the procedural error accurately. Consequently, the only pointers to the degree of comparability of the capabilities of the indexes from country to country are suppositions concerning the adverse effects of different approaches and methodology.

III Approaches to harmonization

- (1) The indexes in the nine countries could be regarded as fully harmonized if it were possible to compare their capabilities without having to tolerate the errors mentioned in the previous section. This does not necessarily require exactly identical methods of calculation; on the other hand, account must be taken of the structural and other characteristics of the population and markets in the various countries, using appropriate methods to obtain a uniform degree of representativeness of the indexes. This applies in particular to the size of the sample for the survey of the basic data of the market basket and for the price survey. Since these surveys can never be full ones, a sampling error, which should not be exceeded, is to be assumed for all countries.

- (2) As far as the other methodological problems such as substitution, treatment of quality changes, etc, are concerned, efforts must be made to establish conventions for comparable cases in the various countries in order to eliminate or standardize the procedural error.
- (3) There is no doubt, however, that the fundamental precondition for unrestricted comparability is an index figure designed in exactly the same way for all countries. The first aim of harmonization must therefore be to match the consumer goods included in the index and the population represented by it.

According to the oldest axiom of the theory of index numbers, the type of index is determined by its intended capability. This question is therefore considered at the beginning of the next section.

1. Type of index

- (1) Two different methods of calculation are used in the nine countries. France and the United Kingdom have calculated a 'chain index' for several years, i.e. new market baskets are set up annually, monthly index numbers of the Laspeyres type are determined over the year and the results linked together to form a continuous series.

A chain index for the period t on a base 0 is defined as:

$$I_{t/0} = I_{t/t-1} \cdot I_{t-1/t-2} \cdot \dots \cdot I_{1/0}$$

A Laspeyres chain index for the period t on a base 0 is thus:

$$KL_{t/0} = \frac{I_{t/0} \cdot P_{k-1} \cdot Q_{k-1}}{P_{k-1} \cdot Q_{k-1}}$$

The other countries use the standard Laspeyres formula retaining a basic market basket for several years.

- (2) The simplest way of obtaining comparable results without changing the type of index would thus be for the chain index countries to calculate Laspeyres indexes as well, since they have all the necessary material for this purpose. It is more difficult for the other countries to calculate a chain index as they have no up-to-date weighting data. It is precisely the time-consuming preparation of weighting coefficients which is given as the reason why an index weighted for present requirements cannot be calculated.
- (3) Closer inspection reveals no difference between the two methods in one respect: the chain index is also based on a Laspeyres index, at least for one year. Furthermore, to obtain continuous series after revisions of the index, the chain-linking procedure is also normally used with the 'pure Laspeyres index'. The difference is thus reduced to the varying frequency of the revisions. There are two opposing standpoints: according to one, frequent changing of the market basket is suitable for the calculation of "more realistic" index numbers, since the weighting and composition of the market basket are closer to reality. According to the other, the conventional Laspeyres index is said to be the "pure price comparison" without which reliable economic interpretation is impossible.

- (4) The confusion which can be observed in public discussions of the 'index problem' arises from the discrepancy between the defined and interpreted capability of the index. As there probably is no 'optimum' index, it is likely that different methods are needed for different purposes. In the context of this study, this means that harmonization may require different types of index or different intervals between revisions of the index.
- (5) If they are to be trusted, a comparison of current national indexes reveals differences exceeding the order of 3 : 1. The index values are fairly evenly distributed between the upper and lower limits; furthermore, if one wishes to go so far, the relative weights of the countries, e.g. as measured against the gross national product, show no concentration within this spectrum.

Changes in the national indexes (1970 = 100)

Country	August 1975	August 1976	Percentage increase
D	135.2	141.4	4.6
F	153.8	168.4	9.5
I	172.5	201.8	17.0
NL	153.1	165.9	8.4
B	151.0	164.4	8.9
L	142.9	157.3	10.1
UK	190.6	217.0	11.4
IRL	187.1	222.4	18.9
DK	158.0	170.1	7.7

- (6) The index problem arises when over a given period there is a positive or negative correlation between the changes in relative prices and relative quantities, which is expressed as a difference between the Laspeyres and the Paasche index. This difference is normally taken as a measurement of the reliability of a basic market basket. As is well known, the Laspeyres index is considered as having an upward bias which tends to increase as one gets further and further away from the time base. Although a great deal is said about the 'ageing' of a base-weighted index, as far as I am aware little attention has

been paid to the fact that the substitution effect underlying the bias obviously plays a similar part during more rapid and spiralling changes in the level of prices. Studies of this aspect are unfortunately not available, but there can be no doubt that price increase rates of more than 10 % can lead to a significant change in consumer behaviour, thus making a base-weighted price index an irrelevant fiction. An example of the change in consumer behaviour is provided by the reaction to the considerable increases in petrol prices since 1973, which have led to an absolute reduction in expenditure in Germany and as a result of which purchases of new cars fell by over 20 %.

- (7) More rapidly-changing consumer habits require more speedy adaption of the market basket. However, the question which has already been raised remains unanswered: what are the most suitable intervals between revisions, i.e. should a new consumer pattern be drawn up annually, or every two, three or five years? Logically, the question should be answered for each country individually, taking into account the degree and rate of changes in price levels. The decision on the frequency of the changes raises the problem of short-term and long-term comparisons, namely, what is the short-term development of a chain index calculated at shorter intervals, and what is its long-term development?
- (8) In this connection, attention is drawn to the agreement between the statistical offices of the six original Member States and the SOEC to change the base years for all indexes calculated in a five-year cycle with effect from 1970. The base year 1970 has now been largely introduced by these countries. If the five-year cycle is maintained and the new Member States follow suit, the following questions will arise with respect to harmonization:
- Is there a significant quantitative difference between chain indexes and Laspeyres indexes, given the same base and five-year revision of the base of the Laspeyres index? Which short- and long-term developments of series may be expected?
- (9) These questions require both a theoretical and quantitative analyses of the index problem. As far as quantitative studies are concerned, reference can only be made here to results already available. On the theoretical side, this document cannot claim to present the index problem in all its ramifications.

(10) Following Frisch,¹ model specifications to solve the index problem can be divided into a functional, theoretical economic aspect and an atomistic and statistical aspect. Comparative-static and dynamic specifications may also be distinguished. Here only the statistical aspect is of interest as it makes do without estimates of orders of preference and thus indifference areas.

A new approach in this direction which has already been used in a few limited cases is based on linear programming optimization (L.P. approach).²

This approach presupposes the designation of consumer goods by means of various quality components and cannot therefore be used for all types of goods (services).

The relationship between economic and statistical specifications is shown in the determination of limits for the 'true' cost-of-living index, for which Bortkiewicz³ found the following formula:

$$\frac{P^p}{L^p} = 1 + r_{xy} \cdot v_x \cdot v_y$$

P = Paasche price index

L = Laspeyres price index

r_{xy} = coefficient of correlation of changes in the ratios of prices and quantities between the base and the given period

v_x, v_y = coefficient of variation of the ratios of prices and quantities

Assuming a negative correlation of changes in prices and quantities, the upper limit is L and the lower limit P.

The statistical approach draws on index formulae in accordance with specific rules (since the Fisher tests)⁴. The most important formulae are those of Laspeyres and Paasche as well as their derivatives (Edgeworth, Fisher). Models of these are based on the comparative-static approach.

1 Frisch, R. The problem of index numbers, *Econometrica*, IV No 1, 1936.

2 Balintfy, Neter and Wassermann: Binary and Chain Comparisons with an experimental linear programming food price index, *The Review of Economics and Statistics*, 52, 1970, p. 324 ff.

3 Bortkiewicz, L.v.: Purpose and structure of a price index number, *Nordisk statistisk tidskrift*, Stockholm 1924.

4 Fisher, I.: *The making of Index Numbers*, Cambridge 1922.

On the other hand, the chain index first proposed by Marshall is based on the idea of a dynamic model. This includes the integral index development by Divisia¹ as well as almost all the more recent approaches such as those of Stuvcl (1957)², Theil (1960)³, Kloek and De Wit (1961)⁴, Khamis (1972)⁵, and Iklé (1972)⁶. These new models have so far been applied only to very limited problems and it is unlikely that they will attain any great significance in the future for official calculations of consumer price indexes owing to their lack of practicality and clarity.

- (11) The normal method of discussing the suitability of various formulae is to subject them to tests and other requirements. Details need not be given here of all the well-known criteria; attention is only drawn to those requirements which are important for the assessment of fixed-base and chain indexes.

Suitable weighting means that the weights should be closely related to the weighted quantities, i.e. the prices. Expressed less strictly, this means that they should be characteristic of at least one of the periods under review.

Unbiasedness means that an index may not deviate from actual conditions as a result of unsuitable weighting.

Circularity is required to enable chain calculations to be made and bases changed. The requirements for suitable weighting and circularity cannot coincide.

Homogeneity is intended to ensure that the same index value is calculated at two different points of time under identical market and price conditions.

-
- 1 Divisia, F.: L'indice monétaire et la théorie de la monnaie, Paris 1926.
- 2 Stuvcl, G.: A New Index Number Formula, *Econometrica*, 1957, XXV, No 1, pp. 123 - 131.
- 3 Theil, H.: Best Linear Index Numbers of Prices and Quantities, *Econometrica*, 1960, XXIX, pp. 464 - 480.
- 4 Kloek, T and De Wit, G.M.: Best Linear and Best Linear Unbiased Index Numbers, *Econometrica*, 1961, XXIX, pp. 602 - 616.
- 5 Khamis, S.H.: A New System of Index Numbers for National and International Purposes, *Journal of the Royal Statistical Society, (A)*, 1972, p. 135.
- 6 Iklé, D.M.: A New Approach to the Index Number Problem, *Quarterly Journal of Economics*, 1972, No 86, p 312.

(12) Unlike fixed-base indexes, the chain index is not homogeneous, as can be proved by simple examples. Anderson worked out a model for various price and market situations, which shows that the chain series reacts sluggishly to fluctuations in prices and quantities, with the result that its development in the economic cycle can lead to different results for similar situations.¹ This would be acceptable if it could be assumed that households' consumer habits were being reflected. Since, however, current consumer behaviour is reflected by the chain index for an earlier period, on the basis of established prices and quantities, so that true purchasing power might be stated exactly with respect to the same situation in an earlier period, this non-homogeneity must be considered a serious drawback.

It is true that completely identical situations can hardly be expected in practice, but fluctuations in the economic cycle are to be observed in all western countries. With non-continuous and/or structural changes, the inherent dynamics of the chain index lead to results which cannot be interpreted and are incorrect, possibly even as regards the direction of the change.

Fowler,¹ who made comparative calculations with fixed-base and chain indexes from British price statistics covering the years 1958 - 1967, confirms the dependency of the chain index on the variability of the prices and quantities used with the following example:³ between 1958 and 1967 food prices rose by 20 - 25 %, whereas the quantities consumed only rose by 3 - 6 %. The following sub-price indexes were calculated for 1967, taking 1958 as base 100:

Laspeyres, P^L	122.80
Laspeyres chain index, P^{KL}	123.49
Paasche chain index, P^{KP}	120.48
Paasche, P^P	120.82

Whereas the general Laspeyres price index is higher than the corresponding chain index in all years, the situation is reversed here on account of the variability.

1 Anderson, O.: Wieder eine Indexverkettung?, *Ausgewählte Schriften*, Volume 2, Tübingen 1963, p. 857

2 Fowler, R.F.: Some problems of Index Number Construction, *Studies in official Statistics*, Research Series No 3, London 1970.

3 Fowler, R.F.: *ibid*, p. 6 ff.

- (13) The chain index is superior to fixed-based indexes as regards suitable weighting, as it is specifically designed to cover the discrepancy in weighting and prices. For the short term, it may be rightly assumed that its weighting accords better with prices.
- (14) Fixed-base indexes are not biased provided that the questions they are required to resolve are identical with their definition. However, this is not normally the case since comparative-static questions become less and less economically relevant as the time progresses. Since the economic aspect of chain index capability is less clearly defined, less can be said about bias. The fact remains that both types of index give very similar results in the short term. There is no easy answer to the question of the long-term development of the index paths. The only figures that can be given are the index numbers for the years 1958 to 1967, i.e. a period of nine years, calculated by Fowler.

Consumer price indexes for the United Kingdom

1958 = 100

Year	Value index	P^L	P^P	P^{KL}	P^{KP}
1958	100.0	100.0	100.0	100.0	100.0
1959	104.3	100.1	100.5	100.9	100.5
1960	109.1	101.7	101.1	101.7	101.1
1961	115.0	105.0	103.8	104.6	103.9
1962	117.5	109.5	107.9	108.5	107.6
1963	126.6	111.7	108.4	110.7	109.4
1964	127.8	115.6	112.4	114.2	112.6
1965	143.6	121.2	116.1	120.3	117.8
1966	147.1	126.1	120.8	124.9	122.3
1967	153.9	129.4	123.4	127.8	125.4

Source: Fowler, R.F.: op.cit., p. 22

As already stated, the chain indexes for all years are intermediate between the Laspeyres and Paasche figures. Fowler correctly states that his study is limited to a particular period and that no general conclusions can therefore be drawn.¹

¹ Fowler, R.F. : op. cit., p. 14

Furthermore, retaining the base over nine years for the Laspeyres index is to be criticized, and the comparison is thus unfair. Because of the difference between Laspeyres and Paasche, revision should have been carried out in 1963 at the latest.

(15) The differences between the various indexes are also of interest:

Year	$P^L - P^P$	$P^L - P^{KL}$
------	-------------	----------------

(see original, replacing
commas with stops)

Source: Fowler, R.F., op. cit., p. 23

This shows that the difference between P^L and P^{KL} up to 1964 and from 1965 increases annually by about the same amount, but that the P^{KL} rose even more rapidly than the pure P^L from 1964 to 1965. However, 1965 is precisely the year with by far the greatest increase in expenditure per household. At least for this year, therefore, the chain index is not to be regarded as a price index but rather as a cost index.

(16) The criticism often made of chain indexes that they accumulate errors in the course of time is confirmed by the aforementioned study by Balintfy et al. A notable feature of this study is the inclusion of both fixed-base and chain indexes in the comparison of the food price index based on the LP approach:

Food price indexes¹

Base = 100

Laspeyres	108.1
Paasche	97.2
Fisher	102.5
L chain index	109.9
P chain index	97.8
F chain index	103.6
LP index	103.7

¹ Balintfy et al, op. cit., p. 329

- (17) In order to arrive at more informative results, periods with cyclical fluctuations would have to be observed over longer intervals in which structural changes occur. This is only possible with simulation models using econometric specifications.
- (18) A theoretical approach to the development of Laspeyres and chain index paths can be found in the work of Allen¹, who comes to the conclusion that the relationship between the two indexes is dependent on the correlations of prices and quantities in the base and adjacent periods. This is not very surprising. Allen states that these correlations may well lead to the chain index moving further away from the Laspeyres index in an upward direction. In the long term, however, he considers the price relationships between two adjacent periods as stochastic variables; the index paths will thus not separate. However, the assumption of stochastic independence appears highly problematical and furthermore, if this were the case, what need would there be for a chain index?
- (19) By definition, chain indexes possess the advantage of being circular. In fact, fixed-base indexes also form a chain in which the same error must be tolerated as in the formation of a long series based on a pure fixed-base index.
- (20) A technical advantage of the chain index is that it facilitates substitution. Since, however, in principle quality changes, referred to the linkage time, should be eliminated, the problem of measuring such changes cannot be avoided.
- (21) The comparative-static information provided by a base-weighted index has the advantage of permitting clear economic interpretation and the disadvantage of steadily losing relevance. On the other hand, a chain index is always more or less up-to-date, but the information it provides cannot be directly interpreted. The pros and cons are probably shown most clearly in medium-term comparison or where there is fairly continuous price level development.

In the short term, as far as information on actual purchasing power is concerned, the chain index is more reliable if the base of the Laspeyres index lies some way back. The more rapidly structures and price levels change, the poorer the quality of the Laspeyres index.

2 Allen, R.G.D.: Price Index Numbers, International Statistical Institute, Ottawa 1963, p. 12 ff.

The base must then be changed more frequently to reduce the structural difference between the two methods. Like any other index, both these types are equally unsuitable for long-term comparisons, assuming that the Laspeyres is brought up to date on the basis of cyclical and structural changes.

- (22) There is no clear delineation between long- and short-term comparisons. Certain guidelines are provided by the Sachverständigenrat der gesamtwirtschaftlichen Entwicklung der Bundesrepublik Deutschland (Board of Experts for Assessment of Overall Economic Trends in the Federal Republic of Germany).¹

This Board would consider the goal of price stability attained if the cost-of-living index could be kept even roughly constant 'with a revision of the weighting method approximately every three to four years'. It follows that if the weighting method is retained for a longer period, the price index can no longer be considered an adequate instrument for measuring price levels.

An International Labour Office (ILO) publication has the following to say on this question:² 'If it is assumed that preference must be given to what is practically realizable, the selection of a suitable instrument for short-term comparisons will have to fall on a Laspeyres chain index with frequent changes - annually or bi-annually - of the weights'.

It continues:

'As it is absolutely essential for the price and quantity changes which take place during the period between two distant points in time to be reflected in long-term comparisons, the changes must be effected in the form of a chain of short-term measurements, short successive periods being compared to each other until an approximate comparison is available for the longer period. By definition, the development in the interval between the past and the present is not reflected by the Laspeyres index, whereas the Paasche index takes no account of the retrospective elements. Long-term indexes can thus be

1 Sachverständigenrat : Annual Report 1969/70, p. 57.

2 International Labour Office: Die Berechnung von Verbraucherpreisindizes (Sonderprobleme) (The calculation of consumer price indexes (special problems)) Geneva 1962, pp. 16 and 17.

constructed and linked for periods of 5 - 10 years by combining both methods, such as in Fisher's ideal index, thus creating a series for longer periods. For those points of time lying between years with sufficient weighting information, index numbers could be 'interpolated' with the aid of the Laspeyres index. If one possessed a continuous stream of price and quantity data, more sophisticated solutions could be attempted than those proposed (e.g. Divisia's differential equation or Stuvell's new index formula).'

- (23) The results of price indexes with varying periods of validity of a basic market basket are not comparable as such. Furthermore, in view of the extraordinary differences in price trends within the Community, one can only recommend that countries with high price increase rates carry out more frequent revisions to bring their procedures more into line with those of France and the United Kingdom, where chain indexes are already calculated. Greater priority should then be accorded to the short-term comparison, which is improved by up-to-date consumer data. However, the intervals between revisions of the market basket must be varied depending on the rapidity of changes in price levels. The difference between the Laspeyres index and a Paasche control index should be used as the criterion of the need for revision, not, as nowadays, as a non-binding maxim but as a formal requirement; if this difference exceeds a pre-determined size, the base must be renewed. In choosing the new base year, provided the change is not too frequent, there is a choice between two or three years, the one closest to a 'normal year' being chosen.
- (24) This method presupposes the collection of up-to-date consumer data. The example of France and the United Kingdom shows that this is possible. If up-to-date consumer data are available, a downward-biased Paasche index can be calculated as well as an upward-biased Laspeyres, as is already done in various countries for control purposes. This allows a Fisher ideal index to be calculated and the varying degrees of bias from country to country to be eliminated. The fact that a Fisher index gives only limited economic information is not such a serious deficiency at international as at national level, and information from the Laspeyres and Paasche figures is in any case always available for domestic purposes.

Similarly, the lack of comparability between index values is not so significant in international comparisons, which are primarily cross-section comparisons.

- (25) Assuming more homogeneous cyclical developments in the Community, and provided that a uniform base year is used (linking base for chain indexes), the direct comparison between Laspeyres index and Laspeyres chain index should not lead to any biases.
- (26) Fowler's proposal (Fowler, 1970, p. 18 to use at least the previous year's prices to bring the weights up to date where there are certain reasons preventing or arguing against the chain index, is unsatisfactory as it would only increase an existing bias in the Laspeyres index.

2. Field of observation

- (1) The scope of an index must be delimited in its functional and institutional aspects. Functional delimitation means defining the consumer goods (goods and services) to be included; institutional delimitation refers to the statistical establishment of the index population to which the index is applicable. Both types of delimitation must be considered together.
- (2) The function of a consumer price index is to measure price developments of goods for private consumption. Private consumption can basically be defined by the concept of market sales or that of supply. Market sales means all sales by enterprises to private households or all purchases by households for their private consumption, i.e. purchases from institutions other than enterprises as well.

The concept of supply encompasses 'actual private consumption' and hence all goods and services which ultimately satisfy household demands within a given period.¹ This results in the following list:²

- (a) households' purchases of goods and services for direct consumption
 - (b) allowances in kind valued at retail prices
 - (c) withdrawals from own enterprise
 - (d) rental value of owner-occupied dwellings
 - (e) domestic output for own requirements
 - (f) (net) material acquisitions from gifts and exchanges
 - (g) use of consumer durables
 - (h) diminution of stocks
 - (i) public services provided by general government
 - (j) services provided to the public by non-profit institutions.
- (3) A compromise is usually made between these two concepts. The ESA, which is to be used here as the basis of the delimitation, gives the following definition.³

1 Sobotschinski, A.: Die Statistik des Verbrauchs der privaten Haushalte, Umriss einer Wirtschaftsstatistik, Hamburg 1966, p. 246, quoted from Wagenführ, R.: Wirtschafts- und Sozialstatistik, vol. 1, Freiburg 1970, p. 460.

2 List based on Wagenführ, R.: loc. cit., p. 460.

3 Statistical Office of the European Communities: European System of Integrated Economic Accounts, 1970.

Final consumption of households

Final consumption of households includes the following items:

- (a) purchases on the market of new durable and non-durable goods, except for houses, apartments etc. and purchases by households of tools, equipment or special clothing needed for their work
- (b) purchases of market services, including the transfer costs incurred when purchasing antiques and existing consumer durables
- (c) agricultural and food products for their own household consumption by farmers, and also the products of private gardens
- (d) goods, other than agricultural and food products, produced by households for their own consumption¹
- (e) benefits in kind provided by employers to their employees
- (f) clothing and food provided for the armed forces and purchased by general government
- (g) social benefits in kind granted to households by general government or private non-profit institutions under social security or social assistance arrangements
- (h) the imputed rent of owner-occupied dwellings
- (i) gifts in kind made by the rest of the world to households, less gifts in kind made by households to the rest of the world
- (j) domestic services produced for themselves by households in so far as they are employers of paid domestic staff
- (k) net acquisitions (purchases less sales) by households of antiques and existing consumer durables
- (l) incidental sales treated in the accounts as direct deliveries to households from the non-market branches general government and private non-profit institutions

The final consumption of households does not include:

- (a) Purchases of land, which are included under the heading net purchases of land
- (b) Purchases of new houses, apartments etc., which are included in gross fixed capital formation

¹ As the value of this consumption in the Member States of the Community is minute and impossible to measure statistically, it has been agreed not to include it in the accounts.

- (c) Purchases by workers of tools, equipment or special clothing needed for their work and for which they receive an allowance from their employer
 - (d) Expenditures by producer units which are to their own benefit as well as that of their employees.
- (4) To determine the scope of a price index, the existence of a price, no matter of what kind, is an obvious criterion in addition to the definition of the concept of private consumption.

Price is the money value of a given unit. For this reason, only goods which can be related to units can be included in the index, and even then only to units whose consumption can be imputed to a certain household. In the case of services, conventional units are arrived at indirectly (mileage rates, haircut).

Public services provided by general government, however, which are partly paid for by direct taxation of households, consist of an indeterminate mixed bag of goods and services, the consumption of which cannot be imputed to the individual household.

The Canadian Statistical Office has the following to say on this subject:¹ '.... there are two essential criteria in drawing the line between items to be included in the index and items to be left outside. Firstly: does the item have a price? Secondly: can the price be identified with a particular quantity of a consumer commodity or with a service? The first criterion is axiomatic in relationship to a price index. If the second criterion is not satisfied, the price cannot be distinguished from the cost and the article cannot therefore be taken into consideration.'

- (5) The 'price problem' obviously also arises in the valuation of private consumption in the ESA. The procedure adopted is as follows (ESA 1970, p. 55):

- products bought on the market: valued at purchase prices
- goods received as gifts from the rest of the world: valued at purchase prices of similar products
- own consumption of agricultural and food products: valued at production prices

1 Quoted from ILO, op. cit., p. 12

- consumption of goods received by employees from their employers as part of their remuneration: valued at production prices
- domestic services: valued at the amount of compensation of employees

(6) As stated above, the index can only include goods and services for which expenditure for consumer purposes can be imputed, since only these influence the purchasing power of households incomes. In accordance with this criterion, the consumer goods to be included in the index are laid down on the basis of the definition of the final consumption of households given in the ESA:

Included are:

- (a) purchases by households of durable and non-durable goods with the exception of tools, equipment and special clothing needed for their work, which workers have bought with a special allowance received for this purpose or from their wages and salaries under the terms of a contractual agreement;
- (b) purchases of market services, including the transfer costs incurred when purchasing antiques and existing consumer durables;
- (c) agricultural and food products produced for their own household consumption by farmers, and also the products of private gardens;
- (e) benefits in kind provided by employers for their employees;
- (h) the imputed rent of owner-occupied dwellings;

(In this case, the use of income is imputable insofar as house-owners render services such as payment of land taxes and amortization of mortgages, or where the net acquisition of owner-occupied dwellings can be regarded as such within a specific period. However, the investment factor must also be taken into consideration.)

- (i) domestic services produced for themselves by households in their capacity as employers of paid domestic staff;
- (j) net acquisitions (purchases less sales) by households of antiques and existing consumer durables.

(7) The criterion of imputable utilization of income requires assessment (for weighting purposes) at retail prices, unlike the ESA, for goods purchased by the households of sole proprietors as well as for own consumption of agricultural products and for allowances in kind.

- (8) For the individual household, direct taxes are counted as consumer expenditure when such expenditure is directly connected with consumption, as in the case of motor vehicle tax. These taxes are more of the nature of indirect taxes and should therefore come within the scope of a consumer price index. This also allows harmonization with countries in which there is no direct motor vehicle tax and the indirect petrol tax is correspondingly higher.
- (9) With this definition of private consumption the statistical unit of the index population is also established, i.e. the household. The index households can be defined by demographic, geographical and socio-economic criteria. A typical household determined on the basis of such criteria would not have the same degree of representativeness for the various Community countries. For the purpose of price comparisons, however, the important thing is not to select a household with a strictly homogeneous composition but one which represents corresponding sections of the entire population.
- (10) The highest degree of comparability is therefore achieved by calculating the index for all households. Such indexes are already available in seven countries of the Community. The best degree of comparability would be achieved if approximately the same percentage of all households were represented in the index. An acceptable target figure would be 90 - 95 %.
- (11) For studies which are not intended to compare the development of the general consumer price level of the entire population but the development of the purchasing power of certain social groups among the entire population, such as the households of pensioners, self-employed persons, etc., different indexes will be required.

3. Statistical sources and methods of determining the basic data of the market basket

- (1) Extensive and detailed weighting data must be used for a consumer price index which is to be representative of all households. The most suitable are obtained from samples of family budgets, stratified in accordance with geographical, demographic and socio-economic criteria, which should be carried out continuously and analysed immediately. Experience in the United Kingdom (Fowler 1970) shows that a 'sliding analysis' of surveys carried out within a three-year period enables the weighting to be improved.
- (2) Where data from national accounts are available and up-to-date, they should be used in the elaboration of the weighting pattern, as is already done in various countries. It is thus of great importance that the definitions and classifications employed in national accounts agree with those for the price index.
- (3) The weights for essential groups of consumer wants such as accommodation, durable goods, insurance and interest (provided the latter is paid on loans for consumption purposes) should be determined in accordance with the definition of private consumption included in the index, taking account of the imputable use of income.

Accommodation: The weight should comprise that part of family budgets spent of rent, taking account of direct subsidies. Owner-occupied dwellings should be included in this weight where they are comparable with rented dwellings. The weight can be determined from information on maintenance, repairs, taxes and water charges, and an equivalent rent corresponding to the average rent paid by the index households. The basis for determining this equivalent rent can also be taxable values, provided these are up-to-date, as well as mortgage repayments and interests, but excluding property owned.

Durable goods: The weight should be determined by purchase value. The analysis of family budgets by means of moving averages smooths out annual variations in expenditure and thus instalment payments. Property elements should be eliminated.

Insurance: The weights for insurance which is obligatory for the majority of the population, such as health insurance, should be determined by the premiums; other forms of non-life insurance are

better recorded through expenditure for repairs of replacement less the cost of the insurance services. Life assurance belongs to the patrimony sector and unemployment insurance should be added to direct taxation.

Interest: is the utilization of income for current consumption if paid on loans for the purchase of consumer goods. The average amount of the loan should then be used as the basis for weighting.

- (4) The determination of items may be based on family budgets; the criteria to be observed are the representativeness of a given sphere of expenditure and suitability for the determination of prices.

4. The market basket

- (1) The ILO recommendations have led to considerable progress in bringing the market baskets of the various countries into line. It is normally possible to compare groups and sub-groups by appropriate rearranging of data.

It would, however, be desirable for all the countries to use a classification and nomenclature consistent with the definition of the field of observation of consumer goods contained in the ESA (p. 155 ff). The representative items for each country could then be inserted below the two- or three-figure entry level.

CLASSIFICATION OF THE FUNCTIONS OF FINAL HOUSEHOLD CONSUMPTION 1, 2

1. Food, beverages and tobacco

11 Food

111 Bread and cereals

112 Meat

113 Fish

114 Milk, cheese and eggs

115 Oils and fats

116 Fruits and vegetables other than potatoes and similar tubers

117 Potatoes, manioc and other tubers

118 Sugar

119 Coffee, tea, cocoa

1110 Other foods, including preserves and confectionery

12 Non-alcoholic beverages

13 Alcoholic beverages

14 Tobacco

2. Clothing and footwear

21 Clothing other than footwear, including repairs

211 Clothing other than footwear

212 Repairs to clothing other than footwear

22 Footwear, including repairs

221 Footwear

222 Repairs to footwear

1 This list is taken from the 'Classification of household goods and services', table 6.1, 'A system of national accounts', United Nations, New York 1968

2 In the NACE/CLIO publication the NIMEXE codes are given for those goods which are covered by the various functions of private consumption.

- 3 Gross rent, fuel and power
 - 31 Gross rents and water charges
 - 311 Gross rents
 - 312 Water charges
 - 32 Fuel and power
 - 321 Electricity
 - 322 Gas
 - 323 Liquid fuels
 - 324 Other fuels

- 4 Furniture, furnishings and household equipment and operation
 - 41 Furniture, fixtures, carpets, other floor coverings and repairs
 - 411 Furniture, fixtures, carpets, other floor coverings
 - 412 Repairs to furniture, fixtures, carpets, other floor coverings
 - 42 Household textiles, other furnishings and repairs
 - 421 Household textiles and other furnishings
 - 422 Repairs to household textiles and other furnishings
 - 43 Heating and cooking appliances, refrigerators, washing machines and similar major household appliances, including fittings and repairs
 - 431 Heating and cooking appliances, refrigerators, washing machines and similar major household appliances, including fittings
 - 432 Repairs to heating and cooking appliances, refrigerators, washing machines and similar major household appliances
 - 44 Glassware, tableware and household utensils including repairs
 - 441 Glassware, tableware and household utensils
 - 442 Repairs of glassware, tableware and household utensils
 - 45 Household operation except domestic services
 - 451 Non-durable household goods
 - 452 Household services excluding domestic services
 - 46 Domestic services

- 5 Medical care and health expenses
 - 51 Medical and pharmaceutical products
 - 52 Therapeutic appliances and equipment
 - 53 Services of physicians, nurses and related practitioners
 - 54 Hospital care and the like
 - 55 Service charges on accident and health insurance

- 6 Transport and communications
 - 61 Personal transport equipment
 - 62 Operation of personal transport equipment
 - 621 Tyres and tubes, parts and accessories and repair charges
 - 622 Gasoline, oils and greases
 - 623 Other expenditure
 - 63 Purchased transport
 - 64 Communications

- 7 Recreation, entertainment, education and cultural services
 - 71 Equipment and accessories for recreational and entertainment purposes, including repairs
 - 711 Radios, television sets and gramophones
 - 712 Photographic and film equipment, musical instruments, boats and other major durables
 - 713 Other recreational and leisure goods
 - 714 Parts and accessories for, and repairs to, recreational and leisure goods
 - 72 Entertainment, recreational and cultural services, excluding those of hotels, restaurants and cafés
 - 73 Books, newspapers and magazines
 - 74 Educational services

- 8 Miscellaneous goods and services
 - 81 Personal care
 - 811 Services of barber and beauty shops, etc
 - 812 Goods for personal care
 - 82 Goods n.e.c.
 - 821 Jewellery, watches, rings and precious stones
 - 822 Other personal goods
 - 823 Writing and drawing equipment
 - 83 Expenditure in restaurants, cafés and hotels
 - 831 Expenditure in restaurants and cafés
 - 832 Expenditure for hotels and similar lodging services
 - 84 Package tours
 - 85 Financial services n.e.c.
 - 86 Services n.e.c.

(2) The value of the market basket should correspond to the monthly expenditure of the index household, which is in fact a fictitious

average household. In other words, the average expenditure on the index items should be estimated from information in the national accounts and family budgets, taking the size of the household into consideration.

- (3) The accuracy of a price index depends basically on the suitability of the index items to reflect the corresponding fields of expenditure, and improves with the number of index items. The number required for each country depends on the individual market situation and cannot be standardized.
- (4) A market basket identical in composition and weighting in all countries is not a suitable way at the present time of improving the comparability of the information provided by the index. On the contrary, on account of the structural differences in consumer behaviour and of the power situation, a representativeness will be achieved in all countries if methods of determining the basic data of the market basket are harmonized.

5. Price survey

- (1) A price index is as good or as bad as the quality of the prices on which it is based. As price surveys can only be samples, the main considerations are suitable selection procedures and sample size. The basic data of the market basket are also determined by as representative selection procedures as possible, which are very expensive. The statistician responsible is faced with the problem of how he should allocate available resources to the two surveys. This depends on the degree of reliability of the estimate aimed for and the dispersion of the parent population.
- (2) For surveying prices, all countries use "purposive" samples in which extensive stratification is carried out on the basis of geographical factors and the trade structure, with a view to achieving the maximum degree of representativeness. For the purposes of international comparison, however, in addition to the maximum degree of representativeness there should also be an equal degree of representativeness and hence the same sampling error in all countries. This can only be properly effected methodologically if the surveys are based on random samples.
- (3) An example of the use of error estimates is provided by the United States. The errors arising in the selection of households, products and reporting units are estimated by means of the standard deviations of the variations for the main components of the consumer price index and published. It is assumed that variations of more than 0.2 % referred to the total index are significant with an error probability of 0.05.¹
- (4) The essential differences in price surveys in the Community consist in the differing proportion of postal surveys (United Kingdom and Denmark) and in the varying degrees of accuracy in describing the index items, in certain cases the substitution of these items and the treatment of a change of reporting unit.

These procedures should be implemented in such a way as to ensure equal representativeness in all countries. Because of the differences in price structure this may require different rules. However, it is essential to ensure that all purchasing conditions affecting the purchase be kept constant.

¹ Wilkinson, M.: Sampling error in the consumer price index, Journal of the American Statistical Association, September 1967.

6. Substitution, quality changes, new products

- (1) The Tenth International Conference of Labour Statisticians (Geneva 1962) issued the following recommendation on these questions: ¹

"Consumer indexes should be based on comparisons between identical or similar qualities of goods, the prices of which are surveyed at different points in time. To meet this requirement, every effort should be made to eliminate the influence of quality changes on price changes"

- (2) It is often maintained that, with conventional price indexes, ignoring quality changes, or not eliminating them sufficiently, clearly results in excessively high price indexes. ² On the other hand, various studies show that such changes do not push the price in one direction only. ³ In any event, the problem of eliminating quality changes to achieve an accurate index is of vital importance, as is that of sampling errors. Particularly in international comparisons, non-standardized methods can produce tendencies which make a longer-term temporal comparison impossible. However, these biases are only known to exist and their direction can only be assumed. An objective method of quantifying the quality components has not yet been found, otherwise these biases could be eliminated. For comparisons within the Community therefore, it is of the utmost importance to arrive at a standard method in this particular field, so that the errors would at least be the same everywhere.

- (3) Chain indexes have the advantage of facilitating substitutions. When, as in the case of France, the 'variétés' under the items of expenditure can be changed within one year, the quality changes within the same year can also be easily eliminated. In the longer term, however, the problem of treating quality changes is also inherent in chain indexes, since even annual chaining can hardly be regarded as a completely satisfactory method.

1 ILO, op.cit., p. 137.

2 Krengel, R.: Wirtschaftswachstum und Preisentwicklung - Anforderungen der Wirtschaftswissenschaften an die Preisstatistik, in: Allgemeines Statistisches Archiv, 1971, Vol. 55, p. 1 ff.

3 of Troplett, I.E.: Determining the effects of quality change in CPI, Monthly Labor Review, May 1971, p.27 ff, and the literature quoted therein.

- (4) In practice, three basic methods are used in all countries:¹ the direct comparison ignores quality changes considered negligible, i.e. as long as a product corresponds to a given description. This method is arbitrary, for what is meant by negligible changes? Certainly not the same thing in each country, as can be seen from the different specifications of items on the survey lists. Gradual quality changes in particular can thus accumulate in the course of time.

Chaining is used when a product whose quality has changed is to be replaced by a comparable product. This presupposes that prices are available for both products, at least at the time the calculation is made, and that the difference in price corresponds to that in quality at that time. The most important factor is therefore the chaining date. This method is also particularly appropriate when a product is discontinued and replaced by a new one. It is precisely in this instance that quality changes often occur which are not eliminated by simply coupling the old and new series.

Where it is impossible to form a chain of price series, the only possibility remaining is to estimate the value of the quality change and continue the price series, applying a correction factor. This is the case which poses the greatest problems and for which only a few recommendations can be given. Sometimes calculations can be based on a dominant factor, or consumers, dealers and manufacturers can be questioned with a view to estimating the user value or production costs.

- (5) Despite their construction, the 'Hedonic price indexes' are only a special application of the latter method. They quantify a quality change by determining characteristics of certain products, particularly technical equipment such as motor vehicles or refrigerators, and then, using a multiple regression, ascertain all the quality components and prices of the designs available on the market to determine the relationship between price and these components. A hypothetical price is thus determined on the assumption that quality remains unchanged. Some interesting results have been obtained with this method in the United States.² It is unable, though, to provide objective information

1 Cf also Kunz, D.: 'Ausgewählte methodische und praktische Probleme des zeitlichen Preisvergleiches' in Allgemeines Statistisches Archiv, 1971/1 vol. 55, p. 23 ff.

2 Cf. Triplett, I.E., op. cit., and Griliches, Z.: Price Indexes and Quality Change. Cambridge 1971

on a large part of the market basket, e.g. foodstuffs and particularly services. However, it deserves to be tried out and applied in the Community.

- (6) The LP approach mentioned above is likewise based on quality components.¹ In an empirical study of a food price index Balintfy et al. determined consumption as the input of a menu unit consisting of a combination of various foods. Using linear programming, the menu combination is then to be specified which, given the food prices, satisfies the requirements of a quantitative combination, with predetermined target variable, of the three characteristics nutritional value, flavour and variety at minimal cost. This approach also can thus be used to distinguish between quality and price components: instead of answering the question to what extent the price level has changed while quality has remained constant, it can determine the imputed price of a commodity taking the quality change into account.
- (7) A further proposal on the long-term determination of quality components was put forward by Krengel.² This approach as well is based on measurable changes in precisely defined product characteristics. However, Krengel's proposal is different from the other two methods in that it is based not on the determination of individual quality changes in various products, for which a price is then estimated 'as though' the quality had remained constant, but rather on the systematic and continuous determination on as broad a basis as possible of the average quality change in all the price index items. This method is based on the assumption of a common set of causes of quality change which certainly does not exist in the comparison of an overall market basket. Indeed, quality improvements are likely in certain groups of products, deterioration in others.
- (8) Preference should be given to the Hedonic Price Indexes method and LP approach, since they take individual quality changes into account and can therefore be used for sub-groups of price index items as well. All three methods described are based on quantifiable quality characteristics and are thus applicable to products with characteristics that can be objectivized. Their applicability for other products is

1 Balintfy et al, op. cit.

2 Krengel, R., op. cit., p. 7 ff.

limited. In particular, they are not applicable to goods and services if the estimation of the value of these is influenced by changes in taste.

Even in the fields in which they can be applied, there are a number of drawbacks: for certain products too few up-to-date prices are normally available to achieve reliable results by multiple regression. Furthermore, even with these methods, there remains a non-quantifiable residue of perceptible changes. Finally, both methods based on individual quality changes break down with the appearance of a new quality component or of new products on the market.

(9) The inclusion of new products raises in principle the same question as arise with quality changes. The most difficult decision is to determine the date of inclusion. The Tenth International Conference of Labour Statisticians makes the following recommendations on this subject:¹

(1) New goods and services which come on the market at either out prices or fairly high prices should not be included in the consumer price index until they have achieved such a degree of popularity with a considerable proportion of the index population that the demand for them is greater than for similar index items, or they make up a considerable portion of the weights given to these items. The consumption of these new goods can be determined from production and turnover figures or small-scale sampling surveys of consumer purchases. If it has been decided to include a new product in the index, two methods may be applied: (a) the product is included in the index group or sub-group to which it belongs by nature, and is given a weight corresponding to its estimated significance within the group and which is deducted from that of the remaining items, or (b) it replaces an old product and takes over its weight without further re-weighting within the group or sub-group.

(2) New goods and services replacing outdated ones on the market and of higher quality than the latter should also be included in the consumer price index by means of direct comparison when the consumer has no other choice and the previous model cannot be replaced by a similar existing one. If, however, the consumer has a certain latitude of choice, the economic value of the difference in quality possessed by the new product should be estimated where possible in order to balance out the price difference and enable the new item to be

¹ ILO, op. cit., p. 138 ff.

added to the index by a combination of price-linking and direct price comparison. If an economic assessment of the quality change is not possible, the new item should be included in the index by means of direct price comparison.

- (3) New goods and services which come on the market as genuine novelties and bring about a perceptible change in the consumer habits of the index population, should be considered as pointing to the necessity for a comprehensive survey of consumer expenditure in order to correct the weighting pattern.

- (10) In view of the quite considerable significance of the methods of treating quality changes and new products for the quality of international comparison it is precisely in this field that the Statistical Office in the Community should agree on standard methods. As there are no objective methods of universal application, generally binding conventions should be worked out for the most frequent cases.

7. Seasonal products

- (1) Owing to the differing geographical and climatic conditions, seasonal products do not have the same consumer significance in each country.¹

This is probably the reason why the various countries use different methods with differing degrees of complexity to take account of the effects of seasonal components.

- (2) There are no 'ideal' methods for this problem either. The fact that they do not provide meaningful comparisons with the previous month or the corresponding month of the previous year argues against market baskets representative of the season (e.g. monthly ones),² as does the fact that they do not provide a correct and therefore interpretable Laspeyres or Paasche price index when averaged over the year. In particular, seasonal developments may differ from year to year; the suitability of a seasonal market basket to express actual seasonal developments in the index is thus somewhat limited.
- (3) It was probably for these reasons that the Tenth International Conference of Labour Statisticians stated that the use of fixed seasonal factors was to be preferred to variable weights. It also stated:³ 'Seasonal factors should be calculated from observations over several years, so that they properly reflect monthly or quarterly fluctuations. The non-adjusted series should be published together with the seasonal factors to enable index users to make corrections in accordance with their own requirements!
- (4) Whereas market baskets with seasonally-changing weighting are intended to clarify a non-seasonally adjusted series, an index calculated 'without seasonal factors' eliminates in particular goods whose prices are subject to considerable seasonal fluctuations. This results in a series which can be considered as quasi-seasonally adjusted. There is thus a very rough seasonal differentiation of the market basket, since the products omitted have varying consumer significance over the year. This index value 'without seasonal goods' can obviously only be used for comparison with the index value of the overall market basket.
- (5) The simplest way of studying the effect on national series of the various methods used in the Community would be for all the countries to calculate index numbers with and without seasonal products. Analysis of the results would then make it possible to establish whether the methods should or

1 See Section II.1., Tabular representation of concepts and methods, column 24.

2 Kunz, D., op. cit., p. 35 ff.

3 International Labour Office, op. cit., p. 139 ff.

could be harmonized.

8. Calculation of the national index

- (1) Very different methods are used in the nine countries, as each has to consider its size and structure.
- (2) The general consensus of opinion is that the most suitable method is to calculate regional price indexes and their weighting by means of the corresponding retail trade turnovers. In this case, however, the different methods are not likely to affect international comparability, since biases with a definite tendency are unlikely in temporal comparisons.

9. Validation, revision, continuous series

- (1) The main aspects of revisions and continuous series have already been dealt with during the discussion of the index formula.

On the problem of continuous series, the Tenth International Conference of Labour Statisticians recommend joining old and new series by means of conversion factors, using the geometric mean of the old and new weights. According to Banerjee,¹ there are good reasons for recommending the Fisher index as the basis of the conversion factor. This is never the worst factor, which cannot be said of the Paasche and Laspeyres index, although no additional data is required to base it on the Fisher ideal index formula.

- (2) As already stated, the accuracy of an index is affected by both procedural and sampling errors. This study has shown that for national indexes to be comparable, errors should not only be as small as possible but also of the same magnitude.

The procedural error can be standardized on the basis of the recommendations made. There is already a good degree of comparability between a number of countries as regards the consumer goods included and the index population chosen.

On the other hand, the sampling error must be assumed, and all the countries must attempt to keep below this error limit by adopting suitable measures with respect to sample size and stratification.

¹ Banerjee, K.S.: Choice of Conversion Factor in the Derivation of an Index of a Discontinued Series, Applied Statistics ('A' Journal of the Royal Statistical Society), Vo. VIII, No 1, March 1959.

Annex 1

Composition and weighting of the market baskets

Federal Republic of Germany

Main groups	Items	
	No	in %
Food and semi-luxuries	259	333.30
Clothing and footwear	84	100.79
Rent	7	126.16
Electricity, gas and fuels	24	45.86
Other goods and services required for running a household	140	113.60
Transport and communications	119	105.37
Hygiene and cosmetics	116	40.41
Education and entertainment	104	60.72
Personal wants; other goods and services	46	73.79
	899	1 000

France

Main groups	Items	
	Number	in %o (1975)
Food	91	285.6
Clothing and household linen	59	104.0
Household:		
rent	1	46.1
water, fuels, electricity	8	77.7
furniture, household goods, cleaning, tobacco etc.	82	270.4
Hygiene and personal requirements	7	42.2
Transport	5	16.7
Miscellaneous	42	157.3
	295	1 000

These are only items of expenditure, the number of "variétés" within these intems is 973.

Italy

Main groups	Number	Items in %
Food and tobacco	105	433
Rent	6	69
Fuels and electricity	7	35
Clothing	36	98
Furniture and household goods	29	58
Personal requirements, hygiene	25	82
Transport and communications	23	104
Education and recreation	29	65
Miscellaneous	12	26
	272	1 000

Netherlands

Main groups	Number	Items in ‰
Food	234	295
Household :		
rent and repairs		90
furniture, equipment house hold goods		101
fuel and electricity		42
Clothing and footwear	137	114
Hygiene and personal requirements	33	112
Education, leisure, tobacco, transport	113	223
Insurance	10	23
	617	1 000

Belgium

Main groups	Items	
	Number	in %
Food, beverages and tobacco	122	264.20
Clothing and footwear	39	96.10
Rent and other charges, heating and light	29	151.40
Furniture and household appliances	44	104.60
Hygiene and cosmetics	15	39.80
Transport and communications	45	142.10
Education and entertainment	32	76.10
Other goods and services	32	125.70
	358	1 000.00

Luxembourg

Main groups	Items	
	Number	in %
Food	57	402
Beverages and tobacco	14	93
Household operation		
household goods	9	19
fuels, electricity, water	10	72
furniture and fittings	16	58
Clothing	29	179
Cleaning, hygiene and cosmetics	11	47
Miscellaneous	27	139
	173	1 000

United Kingdom

Main groups	Items	
	Number	in %
Food	124	232
Meals taken outside the home	5	48
Alcoholic beverages	4	82
Tobacco	2	46
Accomodation	9	108
Fuels and electricity	6	53
Durable household goods	51	70
Clothing and footwear	63	89
Transport and vehicles	17	149
Other goods	32	71
Services	18	52
	331	1 000

Ireland

Main groups	Items	
	Number	in %
Food	110	324
Alcohol, beverages	13	87
Tobacco	5	70
Household operation:		
rent	1	35
taxes and water charges for owner-occupied dwellings	1	18
repairs, decoration and building insurance	2	16
Fuels and electricity	10	55
Clothing	76	88
Durable household goods	52	40
Other goods	45	49
Transport	20	102
Services	36	116
	371	1 000

Denmark

Main groups	Items	
	Number	in %
Food	130	204
Beverages	19	62
Rent	2	90
Heating and electricity	14	42
Clothing	51	79
Household goods	44	73
Tobacco	27	57
Miscellaneous	199	393
	486	1 000

Annex 2

Plan of inquiry to determine structural differences between the
consumer price indexes of the countries of the European Community

- I Definition and function of the index(es); organizational questions; publication
- II Field of observation: consumer goods and index population
- III Statistical sources and methods of determining the basic data of the market basket
- IV The market basket: composition, weighting, base;
- V The price survey
- VI Substitution, quality changes, new products
- VII Seasonal products
- VIII Calculation of the national index
- IX Validation, revision, continuous series

I Definition and function of the index(es); organizational questions; publication

1. Name(s) of index(es)
2. Index formula
 - 2.1. Calculation by quantity weightings or value weightings?
 - 2.2. With the Laspeyres formula: are there regular checks?
(See also LX.1.)
 - 2.3. With the Laspeyres chain index: how frequently are economic calculations made? Are there regular economic calculations?
(See also III.7.)
3. Is the index a pure price index or a cost-of-living index? Are efforts made to achieve a 'pure price comparison'?
4. Are the concepts easily understood by the general public? Are the methods generally comprehensible?
 - 4.1. Are the index and its methods generally accepted by the public or are they contested?
5. Function of the index(es)
 - (a) For the short-term and/or long-term comparison of the general level of prices of goods for private consumption
 - (b) For the adjustment of wages and salaries
 - (c) For the determination of real wages
 - (d) For price adjustment in commercial and civil contracts
 - (e) For deflation purposes in national accounts
6. Compilation of the basic data and preparation of the index
 - 6.1. Which official institutions are consulted?
 - 6.2. Are workers' or employers' organizations involved in preparing the index? Other organizations?
 - 6.3. Are figures available on the number of people involved and the total time worked?
7. Where are methods and results published?
 - 7.1. Frequency of the publications?
 - 7.2. To what extent do the results published differentiate (insofar as calculations are available) between geographical aspects (regions, towns) and material aspects (groups and sub-groups, material goods and services, etc.)?

II Field of observation: consumer goods and index population

1. Which concept of private consumption is the index based on:
 - (a) market concept,
 - (b) consumption concept,
 - (c) combination of (a) and (b),
 - (d) concept based on the country's own national accounts or the ESA?

2. Which items involve differences as regards recording between the consumer concept of the index and that of the national accounts?

3. How therefore are the following items recorded:
 - 3.1. Accommodation: are the costs of owner-occupied homes included? If so, is measurement indirect or direct by the purchase value method or replacement value method?
 - 3.2. Durable goods: are net investments excluded?
 - 3.3. Insurance, in particular health insurance: if life assurance is included, is the savings element taken into account?
 - 3.4. Interest payments?
 - 3.5. Taxes: are indirect and direct taxes included? Are the effects of direct taxes on consumer behaviour assessed?

4. What percentage of consumption as defined in the national accounts is covered by consumption as recorded in the index?

5. Definition of the scope of the index population
 - 5.1. What demographic criteria are applied; families, individuals, households? Are there restrictions as regards size, composition, age?
 - 5.2. What geographical criteria are applied: only urban households?
 - 5.3. What socio-economic criteria are applied: occupation and occupational qualifications of the head of household; minimum or maximum income? Amount of expenditure on private consumption; number of earners in household; are only persons living in rented accommodation included in the index population or are property owners also included? Are members of the armed forces or persons living in homes excluded?

6. What proportion of the total population is represented by the index population?

III Statistical sources and methods of determining the basic data of the market basket

1. Are the index items chosen
 - (a) from family budgets,
 - (b) from other sources?

2. Is the choice of index items from the family budgets dependent on
 - (a) the proportion of the value of total expenditure,
 - (b) the representativeness for a certain field of expenditure,
 - (c) criteria of survey technique?

3. Are the weightings calculated from:
 - (a) family budgets, using random sample methods,
 - (b) family budgets, using other selection methods,
 - (c) production statistics,
 - (d) consumption statistics,
 - (e) retail trade statistics,
 - (f) data from population censuses,
 - (g) data from national accounts?

4. Does the scope of the index correspond to that of the family budgets from the demographic, geographical and socio-economic points of view?

5. What is the procedure for choosing index items and calculating weightings from family budgets or other sources for the following fields of expenditure:
 - 5.1. Accomodation,
 - 5.2. Durable goods: are weightings determined by the purchase price or part payments?
 - 5.3. Insurance (in particular health insurance): are weightings combined with the corresponding property?
 - 5.4. Interest: is this expenditure taken into account in the corresponding groups of consumer requirements?

6. What is the frequency of family budget surveys?
7. Are there continuous family budget surveys?
8. How great is the scope of the family budget surveys conducted at specific times and continuously?
9. Are the continuous family budget surveys analysed immediately?
10. Is there a 'sliding analysis' of several successive surveys which are combined? (United Kingdom, for example).

IV The market basket: composition, weighting, base

1. Scope the index and division into one-, two- and three-digit items?
2. Total number of index items and number of one-, two- and three-digit items?
3. Weightings for individual index items, groups and sub-groups? How far are the weightings divided up?
4. What is the base period? Year, month, day?
5. What determines the choice of base period? International agreements?
6. Number of index items during the last twenty years?
7. Does the market basket correspond to international UNO or ILO recommendations?

V The price survey

1. Definition and number of reporting units?
2. Is the scope of the survey restricted by the definition of the reporting units (e.g. exclusion of the mail order trade)?
3. Are the reporting units chosen in accordance with geographical, socio-economic and market criteria? Which ones?
Is the choice made in accordance with
 - 3.1. the random principle,
 - 3.2. information from secondary records such as retail trade turnover, trade registers, other special-purpose surveys,
 - 3.3. information from family budgets?
4. What method is used to ensure that the reporting units selected correspond with the index population?
 - 4.1. The principle of size of turnover? How is this ensured?
 - 4.2. Random sampling at various levels: region, district, local authority, section of a town, business?
 - 4.3. Taking account of the size and type of the reporting unit and/or the index population in the survey area and weighting the data accordingly?
5. Is the extent of the movement of prices of the various index items taken into account in the selection of the reporting units?
6. Is there a purposive geographic concentration of the reporting units for certain index items, e.g. clothing, household electrical equipment?
7. How is a change of reporting unit created?
8. How and when are allowances made for changes in trade structure?
9. How much and which price information is obtained by direct inquiry and postal inquiry respectively?
10. How exact is the description of the index items:
 - (a) broad,
 - (b) very narrow,
 - (c) contains at least information about which the purchaser normally asks?

11. Examples of description:

<u>Group</u>	<u>Index item</u>	<u>Description in the price survey lists</u>
11.1. Foodstuffs	Fresh meat, milk, beer	
11.2. Clothing and footwear	Men's suit	
11.3. Accommodation	Monthly rent of a new dwelling for household of 4 persons	
11.4. Household goods	Table for sitting-room, oil-fired stove	
11.5. Communications and transport	Moped	
11.6. Hygiene and cosmetics	Hairdressing, medical treatment	
11.7. Education and entertainment	Records, camera	
11.8. Other goods	Third party insurance for motor vehicles	

12. Particular price survey problems with the following groups;

- 12.1. Accommodation: how are 'prices' of owner-occupied homes calculated? (See also II.2.1.). Is the stratification detailed enough to ensure comparability? To what extent are rent controls and other factors effecting rent taken into account?
- 12.2. Durable goods: should changes in 'costs' (maintenance, repairs) or in the purchase price represent the price movement?
- 12.3. Insurance: how are the 'prices' for insurance determined?
- 12.4. Interest payments: what types of interest are selected to represent prices?

13. What are the qualifications (education and special training) of the enumerators?

14. Do the enumerators have a regular occupation? To which institution do they belong?

15. Do they work in an honorary capacity? Do they conduct the surveys as part-time employment?

16. How much are they paid?

17. Are they provided with general instructions? How extensive are these instructions?
18. How frequent are the surveys for the individual index items?
 - (a) the 15th of each month
 - (b) every week
 - (c) a particular week-day or a particular week in the month
 - (d) once a quarter
 - (e) other
19. Is the extent of the price movements for the different index items taken into account in the number of price series (number of prices recorded per index item)?
20. How are discounts, rebates, special offers and closing-down sales dealt with?
21. How are non-responses dealt with?
22. Are there special survey methods for the prices of certain items such as rent, scales of charges, etc.?

VI Substitution, quality changes, new products

1. When it is necessary to substitute an index item:
 - 1.1. Is the item replaced or are the item and weighting deleted or is the item deleted and the weighting added to the sub-group?
 - 1.2. Is the matter left until the next revision of the index?
 - 1.3. Are attempts made to distinguish between price and quality changes?
2. Are there tolerance limits for the prices observed, so that if they are exceeded as a result of too few observations being made, substitution becomes necessary? (e.g. the Netherlands).
3. Do the enumerators keep lists of types of goods in demand?
4. How are quality changes determined and dealt with?
 - 4.1. Are certain factors used to determine quality? How and by whom? Are corrective factors calculated?
 - 4.2. Are quality changes eliminated by determining cost differences? Are experts, producers, vendors involved?
 - 4.3. Are quality changes eliminated by linking overlapping price series?
 - 4.4. Are they eliminated by regression analyses? How are the results assessed?
 - 4.5. Is there in some cases no elimination, but a direct comparison? How is this procedure justified and what effect does it have on the long-term development of the index series?
5. Are representative or other types of opinion polls on quality changes conducted among consumers and experts?
6. Is the price flexibility of demand taken into account in the event of quality changes?
7. How are gradual quality changes treated?
8. Are regular adjustments made for the age of the dwellings under the heading 'Accommodation' (maintenance of a 'fixed market basket')?
9. How is seasonal quality variation dealt with?
10. Are studies on price families and parallel price behaviour carried out?

11. There are three types of new products: competitive variation on an old product, replacement for an old product, completely new product (e.g. with technical innovations). How are these three types of new product taken into consideration?
12. How is the date for including new products determined? Is the initial phase with high or special prices taken into account?
13. When does a change in consumption structure lead to revision?
14. Is a new product first included with a low weighting which is steadily increased?

VII Seasonal products

1. Are the series examined for seasonal periodic fluctuations?
2. Are the basic data of the market basket checked for seasonal dependency?
 - 2.1. as regards composition and weighting of the market basket,
 - 2.2. as regards prices in the base year?
3. How are seasonal adjustments carried out?
 - (a) Seasonal changes in weighting (market baskets for certain months for seasonal goods),
 - (b) corrective factors for price movements,
 - (c) fixed seasonal factors for the total index,
 - (d) fixed seasonal factors for individual items,
 - (e) calculation and publication with and without seasonal goods?
4. Which goods are regarded as seasonal?
5. What is the procedure as regards the seasonal disappearance of index items?
 - (a) The item is deleted from the weighting, the weighting is omitted or added to the group?
 - (b) The last price is kept constant?
 - (c) 'Monthly market baskets' in the year under review and the base year are compared?
 - (d) The weighting scheme within the groups is altered?
 - (e) Prices are estimated for the intervening months?
6. How great is the weighting proportion of seasonal goods in the whole market basket?

VIII Calculation of the national index

1. Are regional indexes calculated and then weighted
 - 1.1. according to the resident population in the base year,
 - 1.2. according to regional turnover in the base year?

2. Are average national price indexes calculated and then weighted
 - 2.1. according to the resident population in the base year,
 - 2.2. according to regional turnover in the base year?

IX Validation, revision, continuous series

1. Are there regular cross-checks for accuracy? What type?
2. Are checks made for systematic errors:
 - 2.1. random sampling errors,
 - 2.2. procedural errors?
3. Are revisions carried out at regular intervals?
4. What conditions lead to revisions if they are not carried out at regular intervals?
5. Are minor weighting adjustments made between revisions?
6. How are continuous series achieved?
 - (a) Parallel calculation with old and new weightings?
 - (b) Continuity ensured by conversion factors? How are these calculated? Linking? Linked over a month or a year?

DE EUROPÆISKE FÆLLESSKABERS STATISTISKE KONTOR
STATISTISCHES AMT DER EUROPÄISCHEN GEMEINSCHAFTEN
STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES
OFFICE STATISTIQUE DES COMMUNAUTÉS EUROPÉENNES
ISTITUTO STATISTICO DELLE COMUNITÀ EUROPEE
BUREAU VOOR DE STATISTIEK DER EUROPESE GEMEENSCHAPPEN

J. Mayer **Generaldirektør/Generaldirektor/Director-General/Directeur général/Direttore generale/Directeur-generaal**

E. Hentgen **Assistent/Assistent/Assistant/Assistant/Assistente/Assistent**

Direktører/Direktoren/Directors/Directeurs/Direttori/Directeuren:

G. Bertaud Statistiske metoder, information
Statistische Methoden, Informationswesen
Statistical methods, information processing
Méthodologie statistique, traitement de l'information
Metodologia statistica, trattamento dell'informazione
Methodologie van de statistiek, informatieverwerking

V. Paretti Aimen statistik og nationalregnskab
Allgemeine Statistik und Volkswirtschaftliche Gesamtrechnung
General statistics and national accounts
Statistiques générales et comptes nationaux
Statistiche generali e conti nazionali
Algemene statistiek en nationale rekeningen

D. Harris Befolknings- og socialstatistik
Bevölkerungs- und Sozialstatistik
Demographical and social statistics
Statistiques démographiques et sociales
Statistiche demografiche e sociali
Sociale en bevolkingsstatistiek

S. Louwes Landbrugs-, skovbrugs- og fiskeristatistik
Statistik der Landwirtschaft, Forstwirtschaft und Fischerei
Agriculture, forests and fisheries statistics
Statistiques de l'agriculture, des forêts et de la pêche
Statistiche dell'agricoltura, delle foreste e della pesca
Landbouw-, bosbouw- en visserijstatistiek

H. Schumacher Industri- og miljøstatistik
Industrie- und Umweltstatistik
Industrial and environmental statistics
Statistiques de l'industrie et de l'environnement
Statistiche dell'industria e dell'ambiente
Industrie en milieustatistiek

S. Ronchetti Handels-, transport- og servicestatistik
Handels-, Transport- und Dienstleistungsstatistik
Trade, transport and services statistics
Statistiques des commerces, transports et services
Statistiche dei commerci, trasporti e servizi
Handels-, vervoers- en dienstverleningsstatistiek

**Salgs- og abonnementskontorer - Vertriebsbüros - Sales Offices
Bureaux de vente - Uffici di vendita - Verkoopkantoren**

Belgique - België

Moniteur belge - Belgisch Staatsblad

Rue de Louvain 40-42 —
Leuvenseweg 40-42
1000 Bruxelles — 1000 Brussel
Tél. 512 00 26
CCP 000-2005502-27 —
Postrekening 000-2005502-27

Sous-dépôt — Agentschap :

Librairie européenne —
Europese Boekhandel
Rue de la Loi 244 — Wetstraat 244
1040 Bruxelles — 1040 Brussel

Danmark

J.H. Schultz — Boghandel

Montergade 19
1116 København K
Tel. 14 11 95
Girokonto 1195

BR Deutschland

Verlag Bundesanzeiger

Breite Straße - Postfach 108 006 - 5000 Köln 1
Tel. (0221) 21 03 48
(Fernschreiber: Anzeiger Bonn 08 882 595)
Postscheckkonto 834 00 Köln

France

*Service de vente en France des publications
des Communautés européennes*

Journal officiel

26, rue Desaix
75 732 Paris — Cedex 15
Tél. (1) 578 61 39 — CCP Paris 23-96

Ireland

Stationery Office

Beggar's Bush
Dublin 4
Tel. 68 84 33

Italia

Libreria dello Stato

Piazza G. Verdi 10
00198 Roma — Tel. (6) 85 08
Telex 62008
CCP 1/2640

Agenzie:

00187 Roma — Via XX Settembre
(Palazzo Ministero
del Tesoro)
20121 Milano — Galleria
Vittorio Emanuele, 3
Tel. 80 64 06

**Grand-Duché
de Luxembourg**

*Office des publications officielles
des Communautés européennes*

5, rue du Commerce
Boîte postale 1003 — Luxembourg
Tél. 49 00 81 — CCP 191-90
Compte courant bancaire:
BIL 8-109/6003/300

Nederland

Staatsdrukkerij- en Uitgeverijbedrijf

Christoffel Plantijnstraat, 's-Gravenhage
Tel. (070) 81 45 11
Postgiro 42 53 00

United Kingdom

H.M. Stationery Office

P.O. Box 569
London SE1 9NH
Tel. (01) 928 6977, ext. 365
National Giro Account 582-1002

United States of America

European Community Information Service

2100 M Street, N.W.
Suite 707
Washington, DC 20 037
Tel. (202) 872 8350

Schweiz - Suisse - Svizzera

Librairie Payot

6, rue Grenus
1211 Genève
Tél. 31 89 50
CCP 12-236 Genève

Sverige

Librairie C.E. Fritze

2, Fredsgatan
Stockholm 16
Post Giro 193, Bank Giro 73/4015

España

Librería Mundi-Prensa

Castelló 37
Madrid 1
Tel. 275 46 55

Andre lande - Andere Länder - Other countries - Aulres pays - Altri paesi - Andere landen

Kontoret for De europæiske Fællesskabers officielle Publikationer - Amt für amtliche Veröffentlichungen der Europäischen Gemeinschaften - Office for Official Publications of the European Communities - Office des publications officielles des Communautés européennes - Ufficio delle pubblicazioni ufficiali delle Comunità europee - Bureau voor officiële publikaties der Europese Gemeenschappen

Luxembourg 5, rue du Commerce Boîte postale 1003 Tél. 49 00 81 CCP 191-90 Compte courant bancaire BIL 8-109/6003/300

FB 200

DKr 31

DM 13

FF 27

Lit 4 550

Fl 13,50

£ 3.20

US \$ 5.40

KONTORET FOR DE EUROPÆISKE FÆLLESSKABERS OFFICIELLE PUBLIKATIONER
AMT FÜR AMTLICHE VERÖFFENTLICHUNGEN DER EUROPÄISCHEN GEMEINSCHAFTEN
OFFICE FOR OFFICIAL PUBLICATIONS OF THE EUROPEAN COMMUNITIES
OFFICE DES PUBLICATIONS OFFICIELLES DES COMMUNAUTÉS EUROPÉENNES
UFFICIO DELLE PUBBLICAZIONI UFFICIALI DELLE COMUNITÀ EUROPEE
BUREAU VOOR OFFICIËLE PUBLIKATIES DER EUROPESE GEMEENSCHAPPEN

Boîte postale 1003 - Luxembourg

CA OF 76-336-EN-C
7336